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MARCH 1960

MECCANO

MAGAZINE



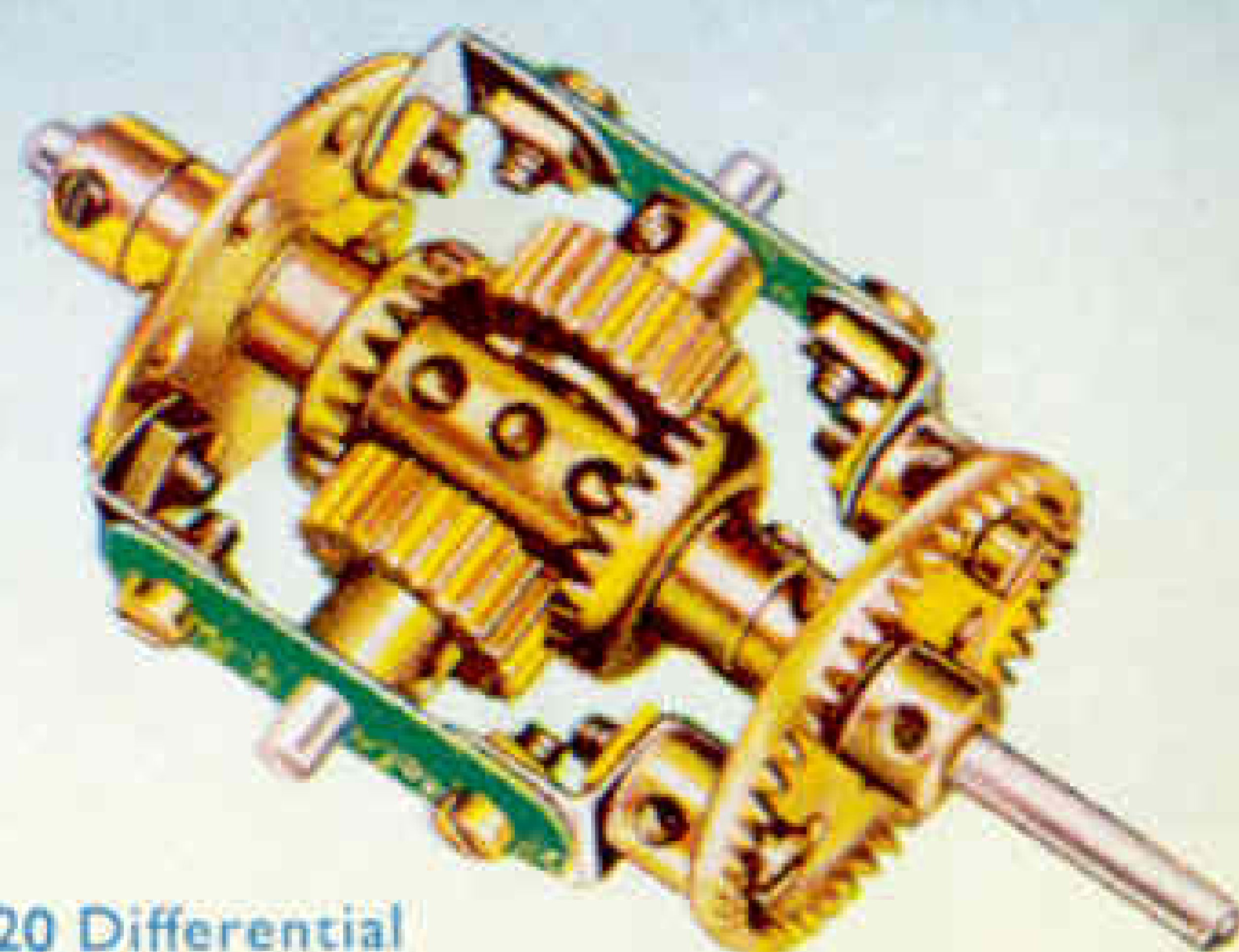
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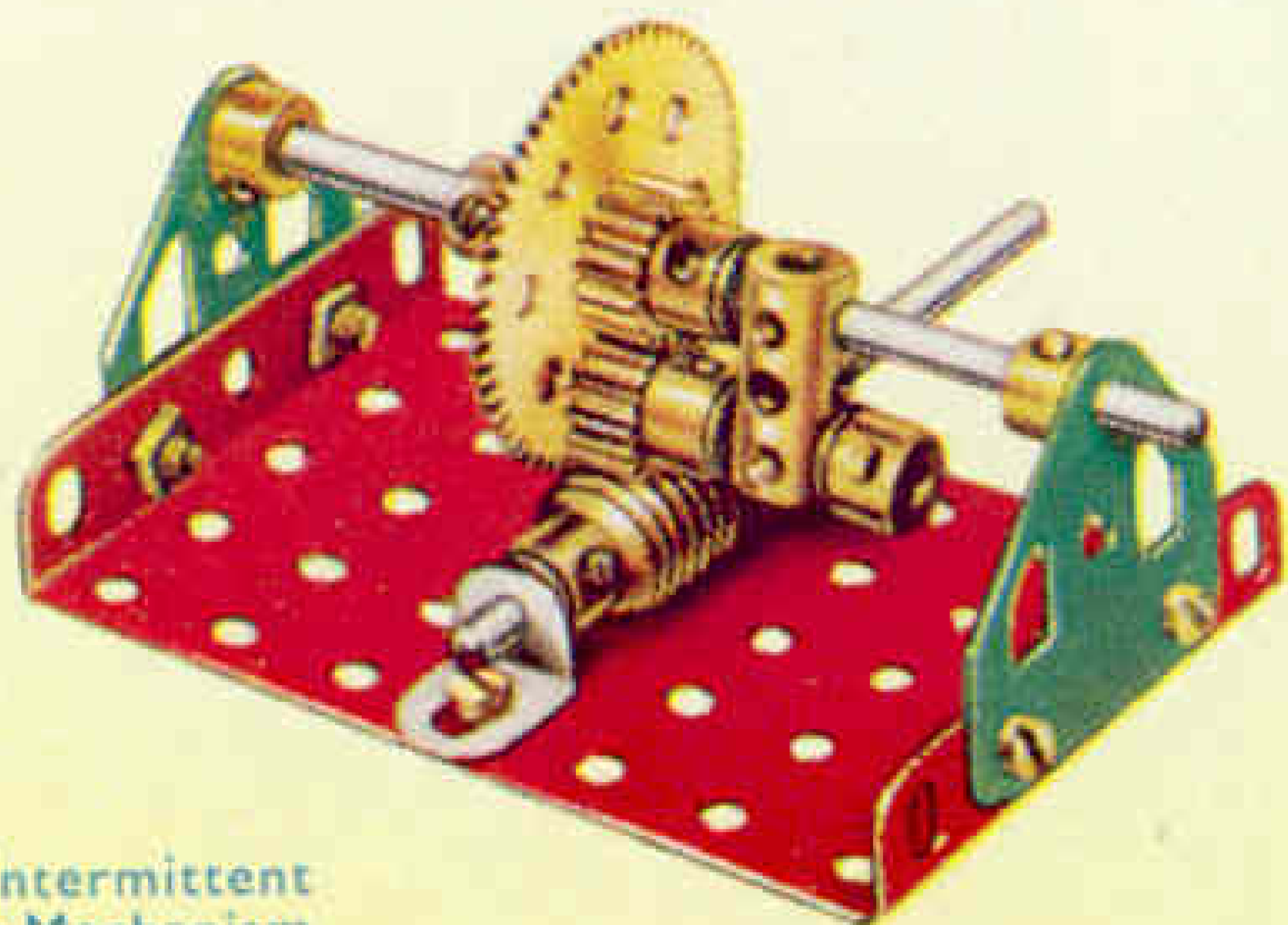


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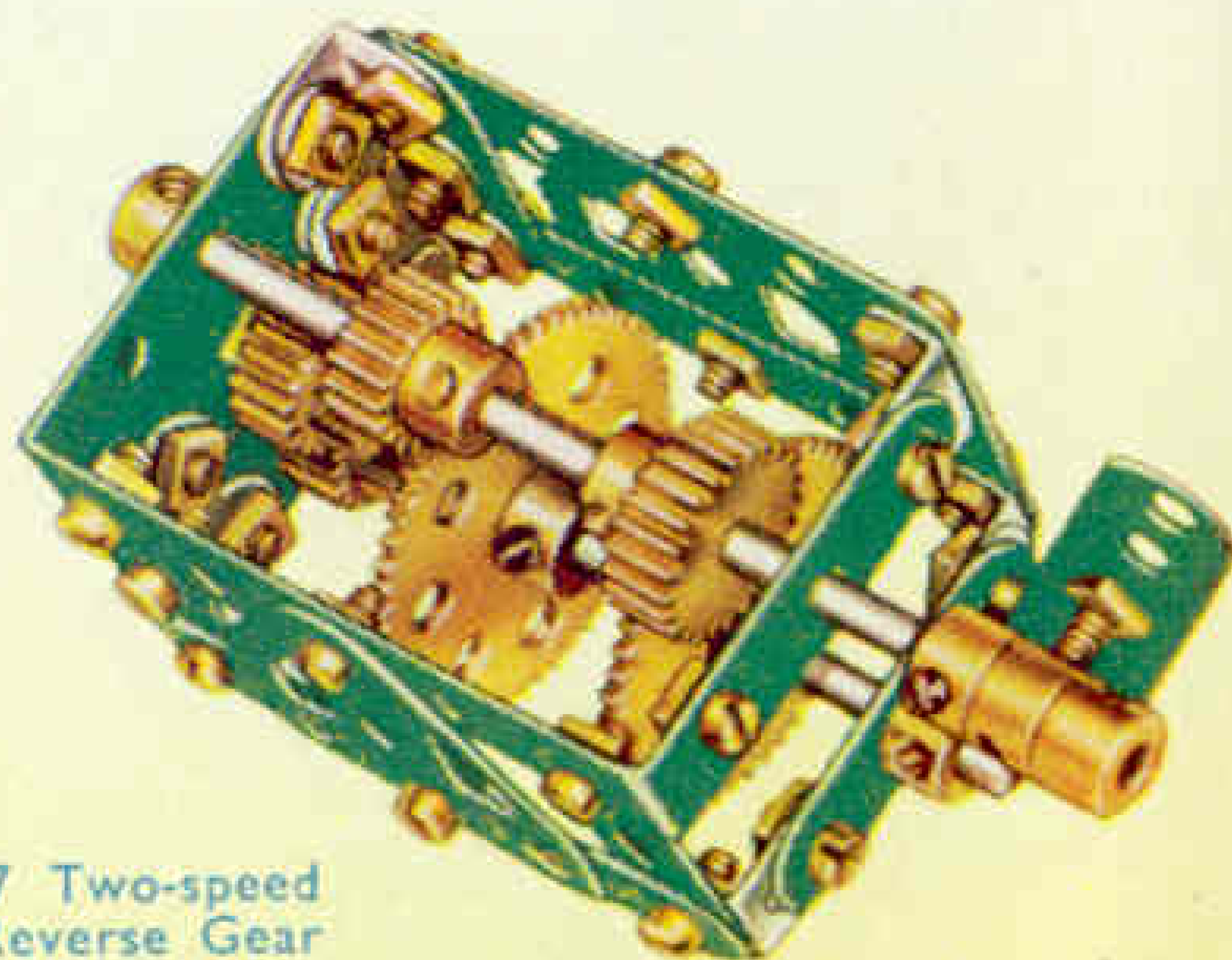
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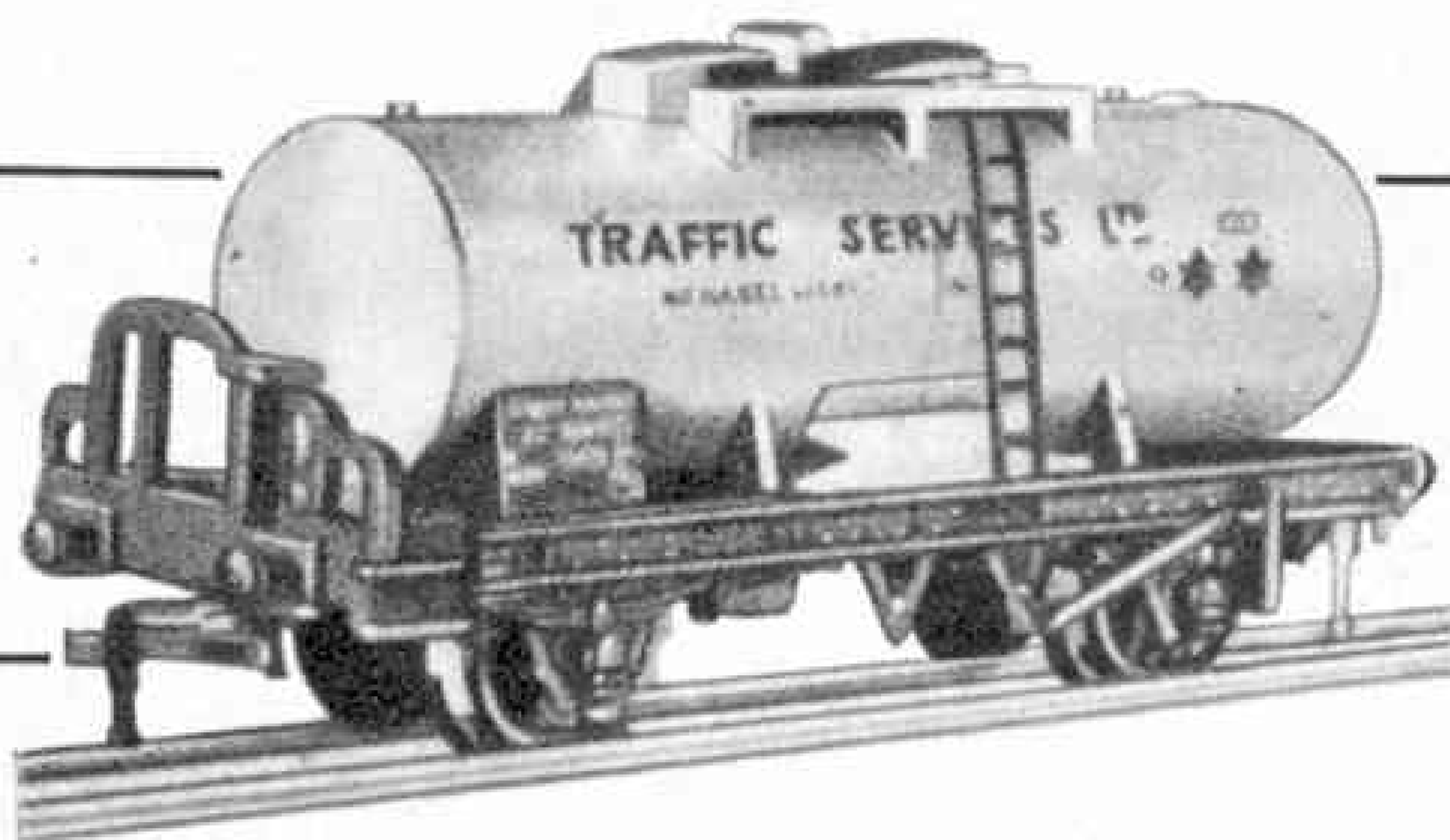
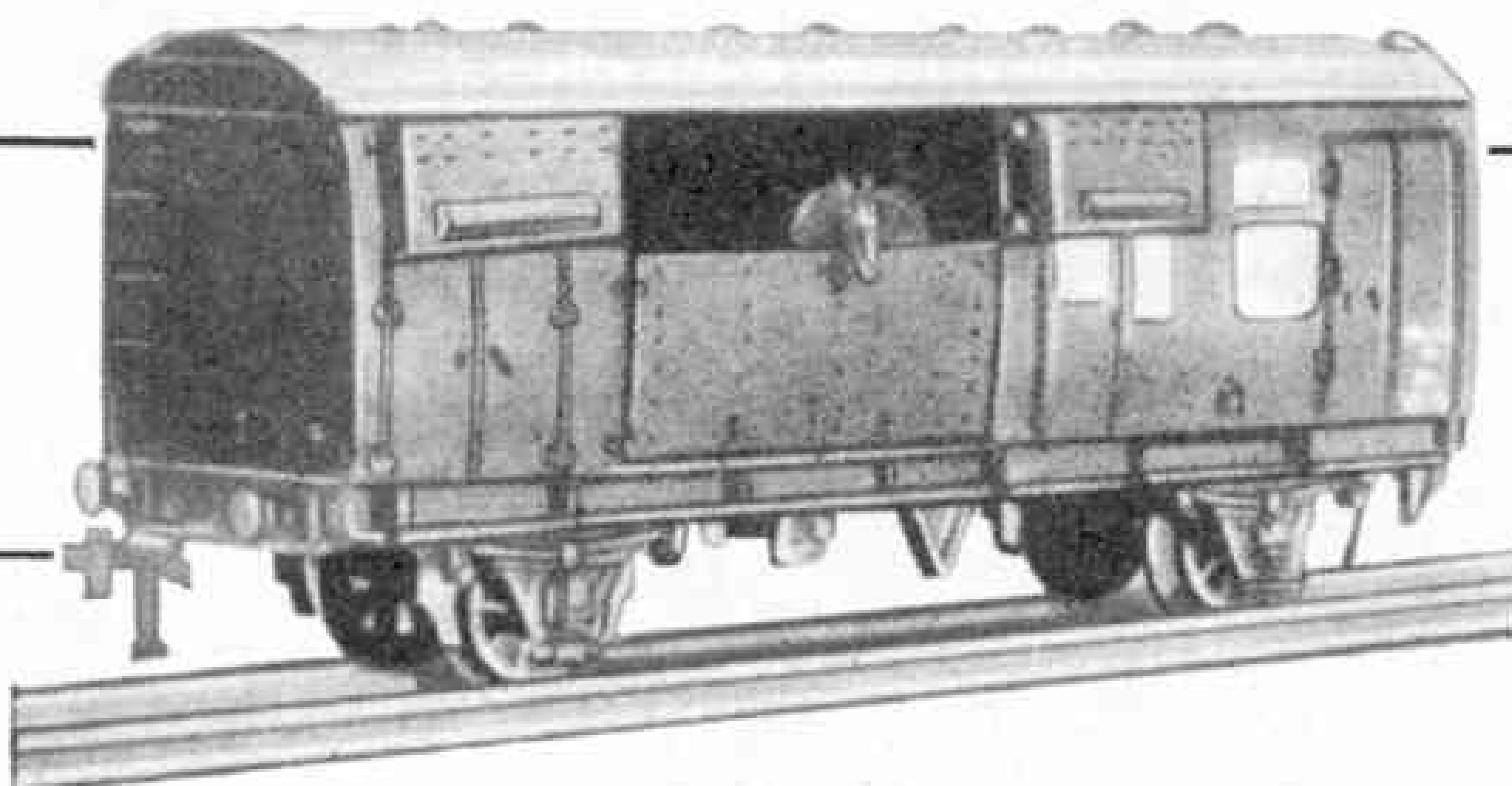
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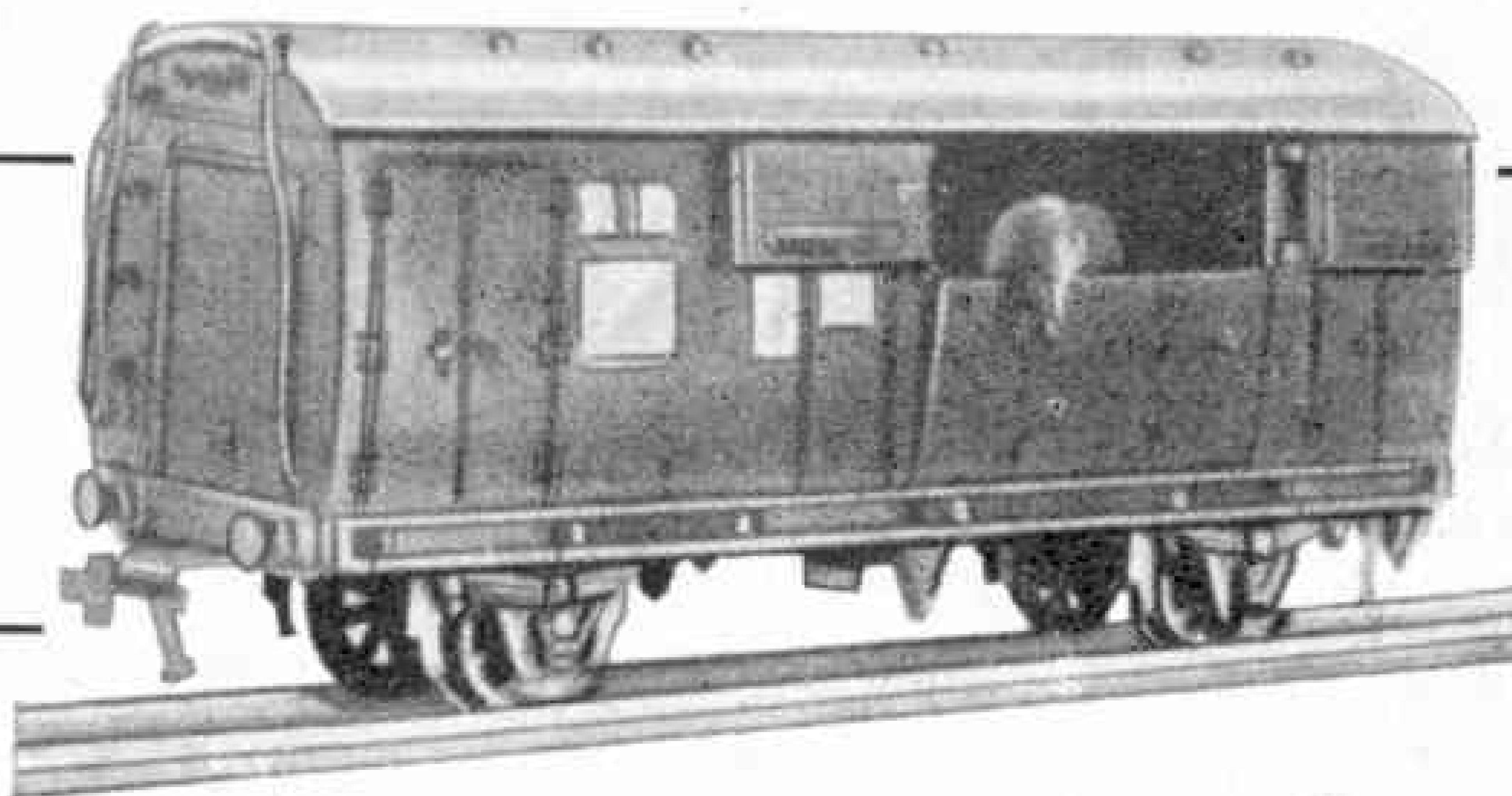
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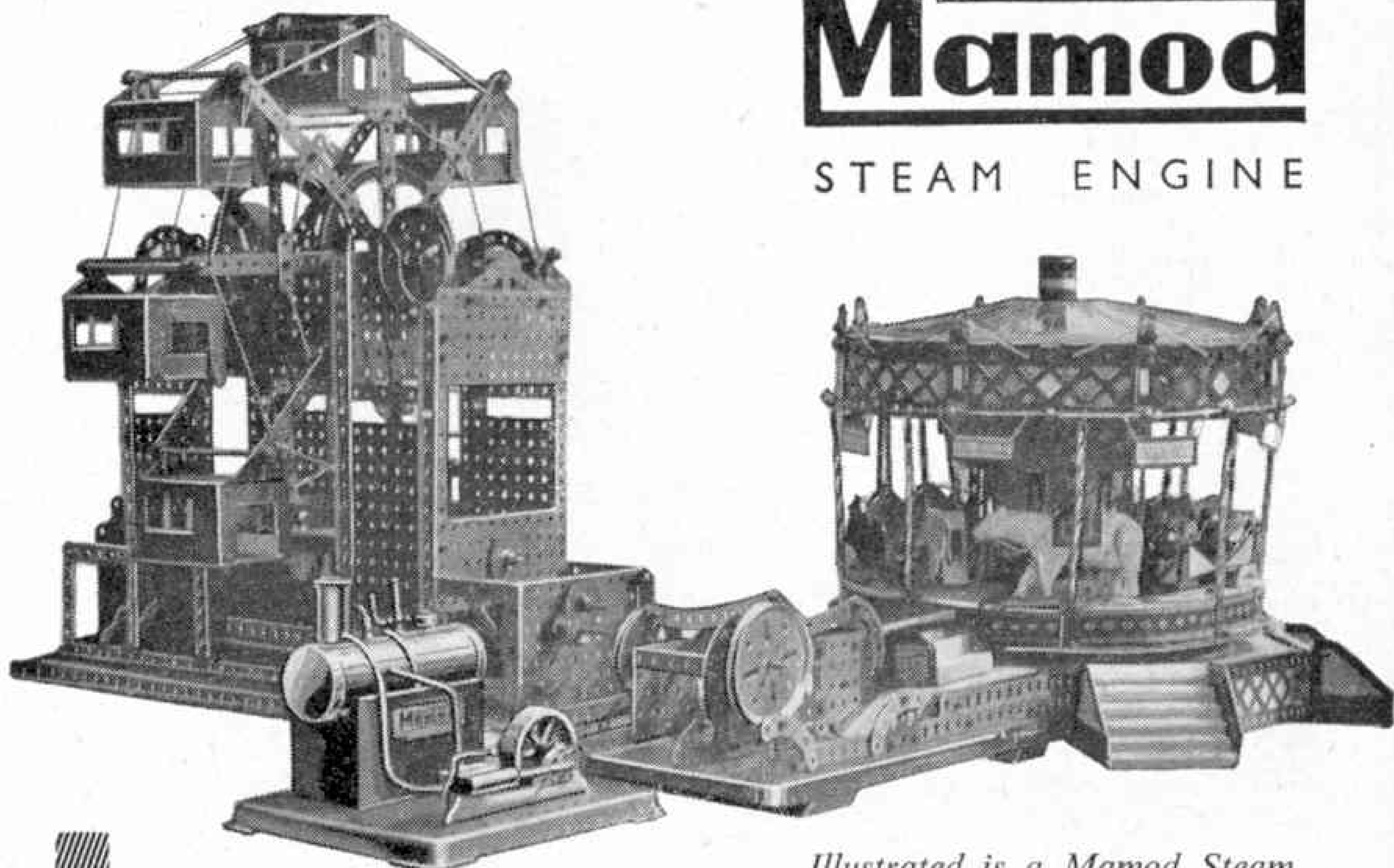
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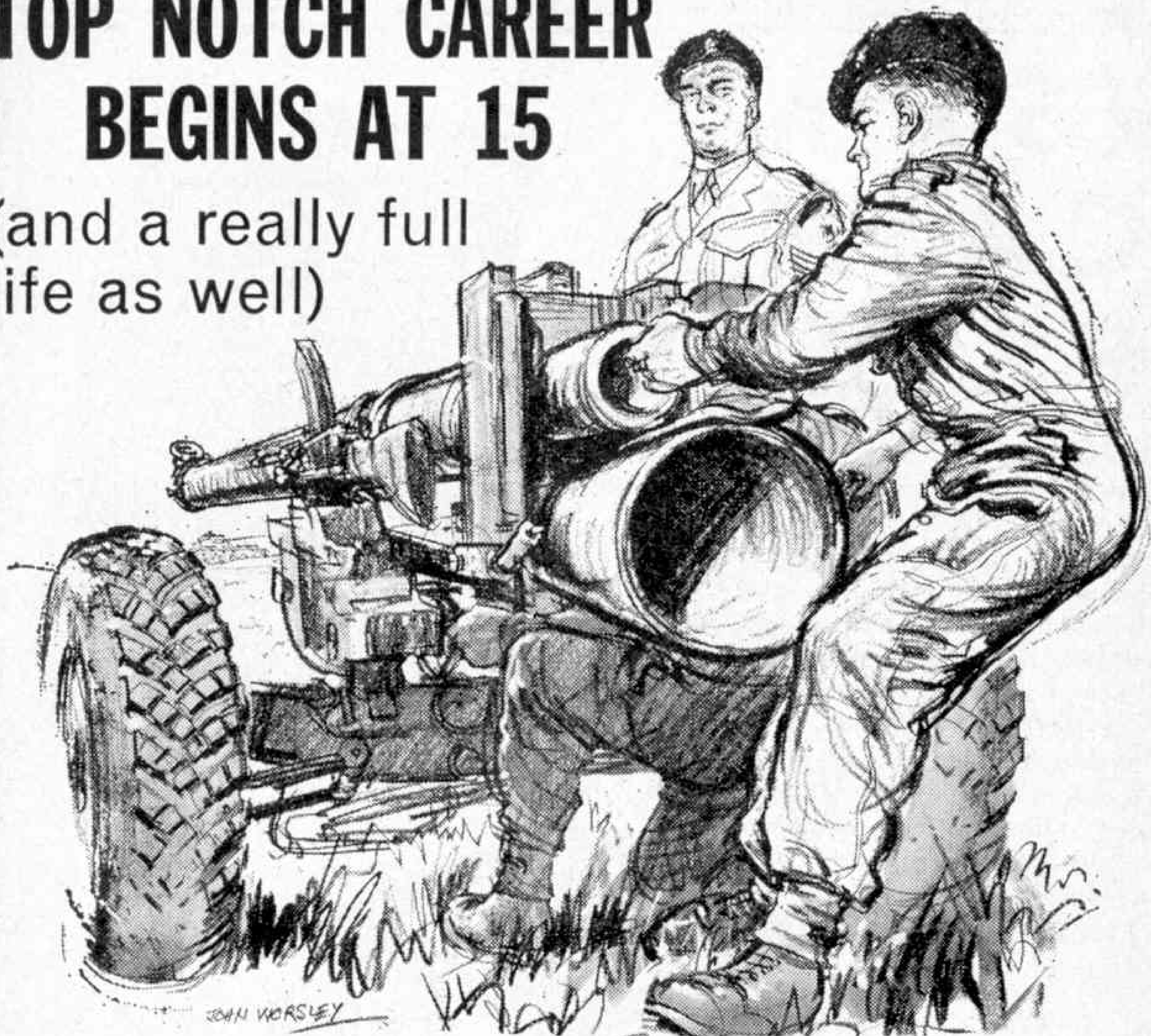
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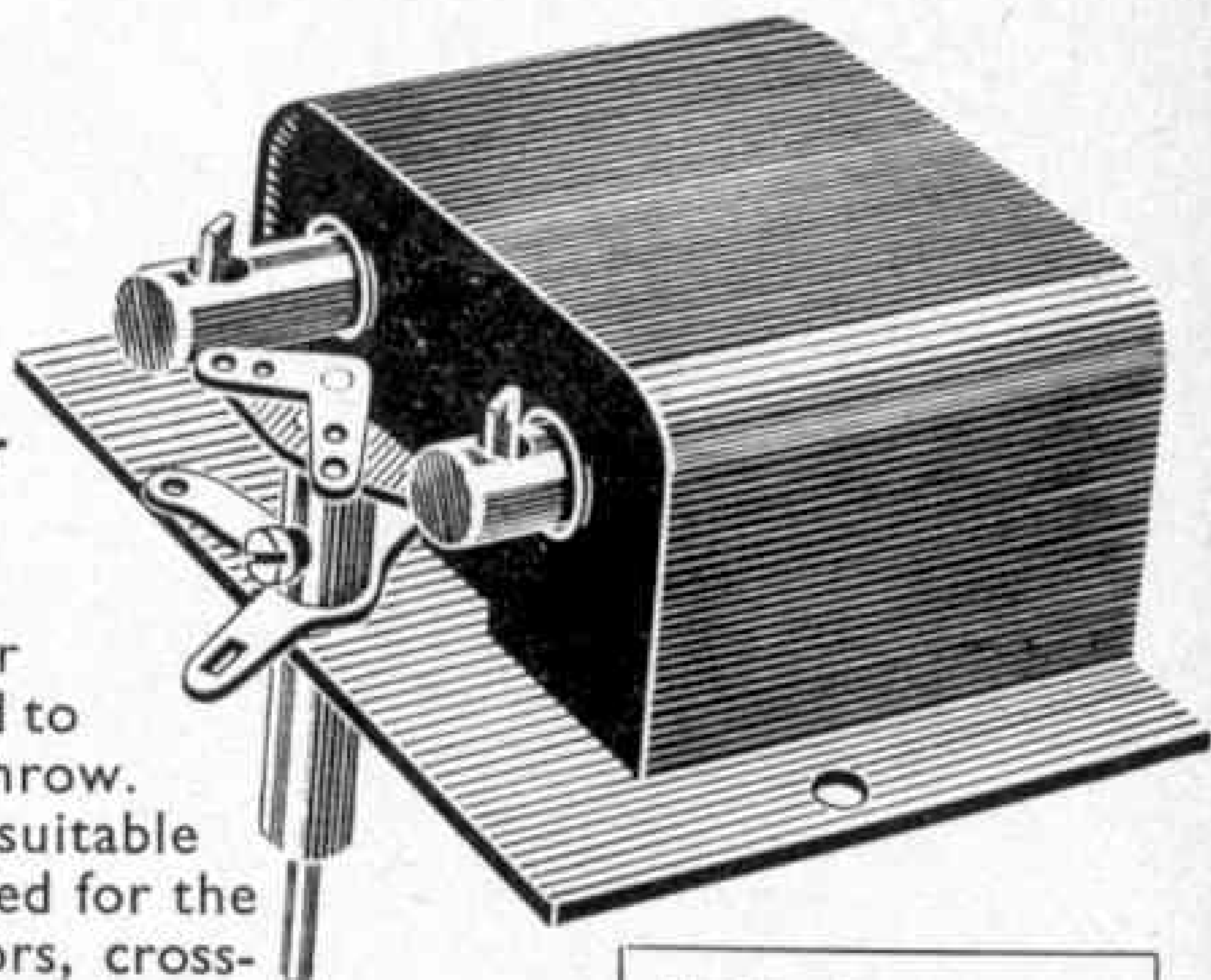


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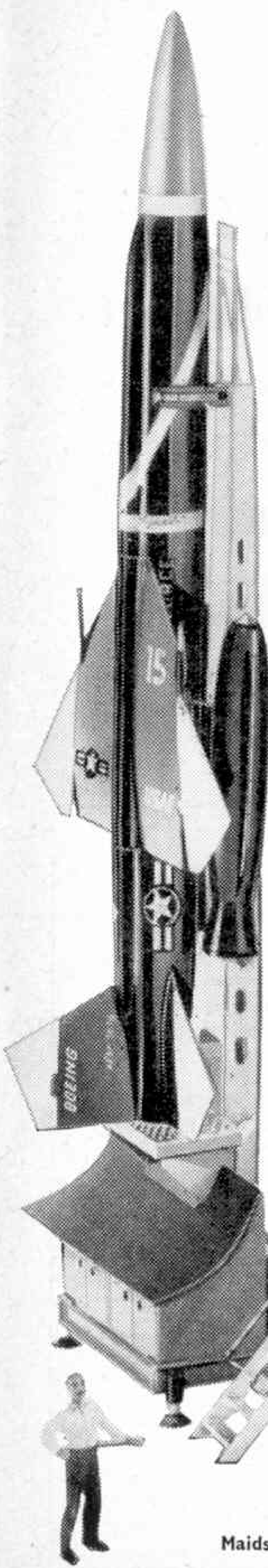
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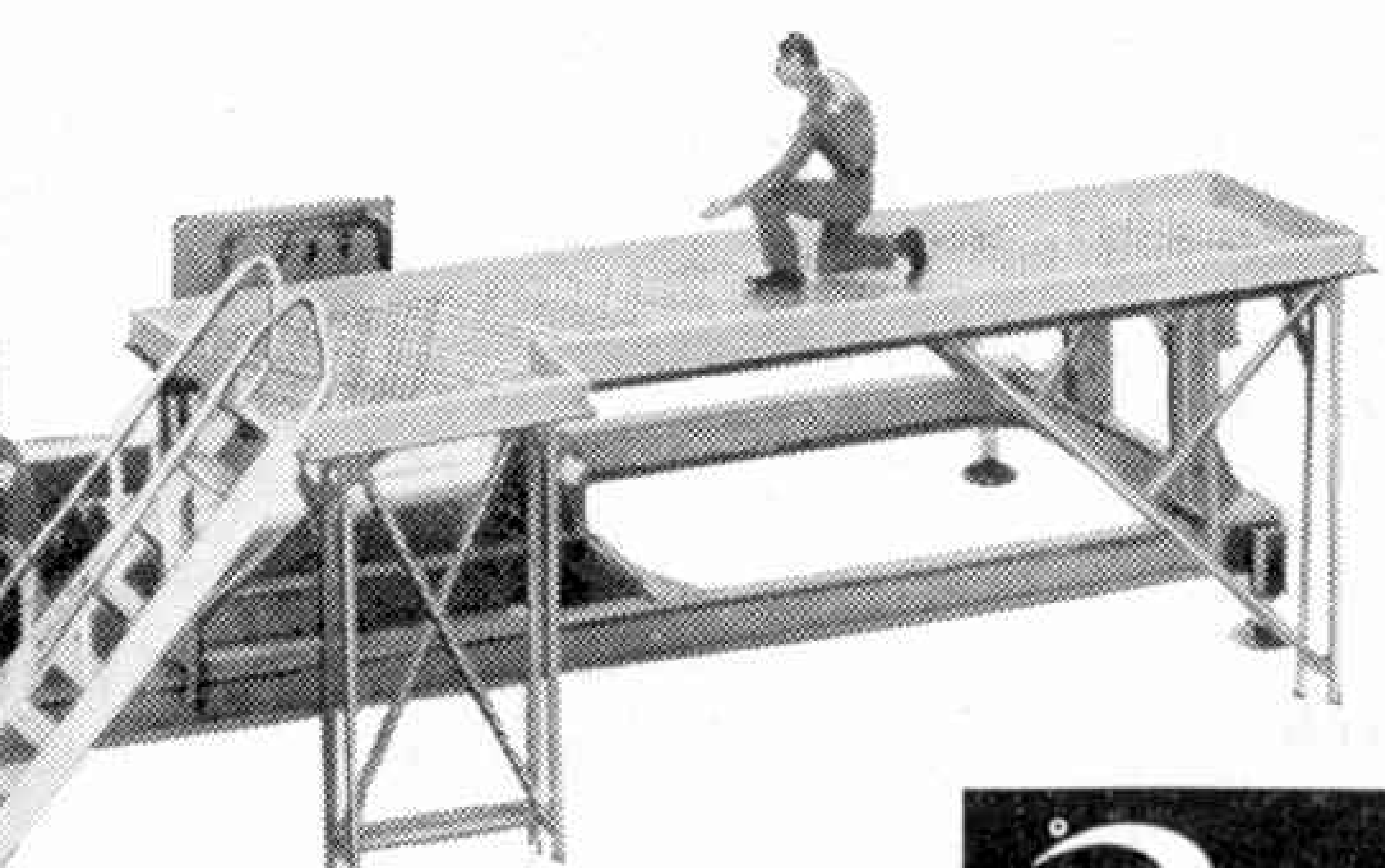
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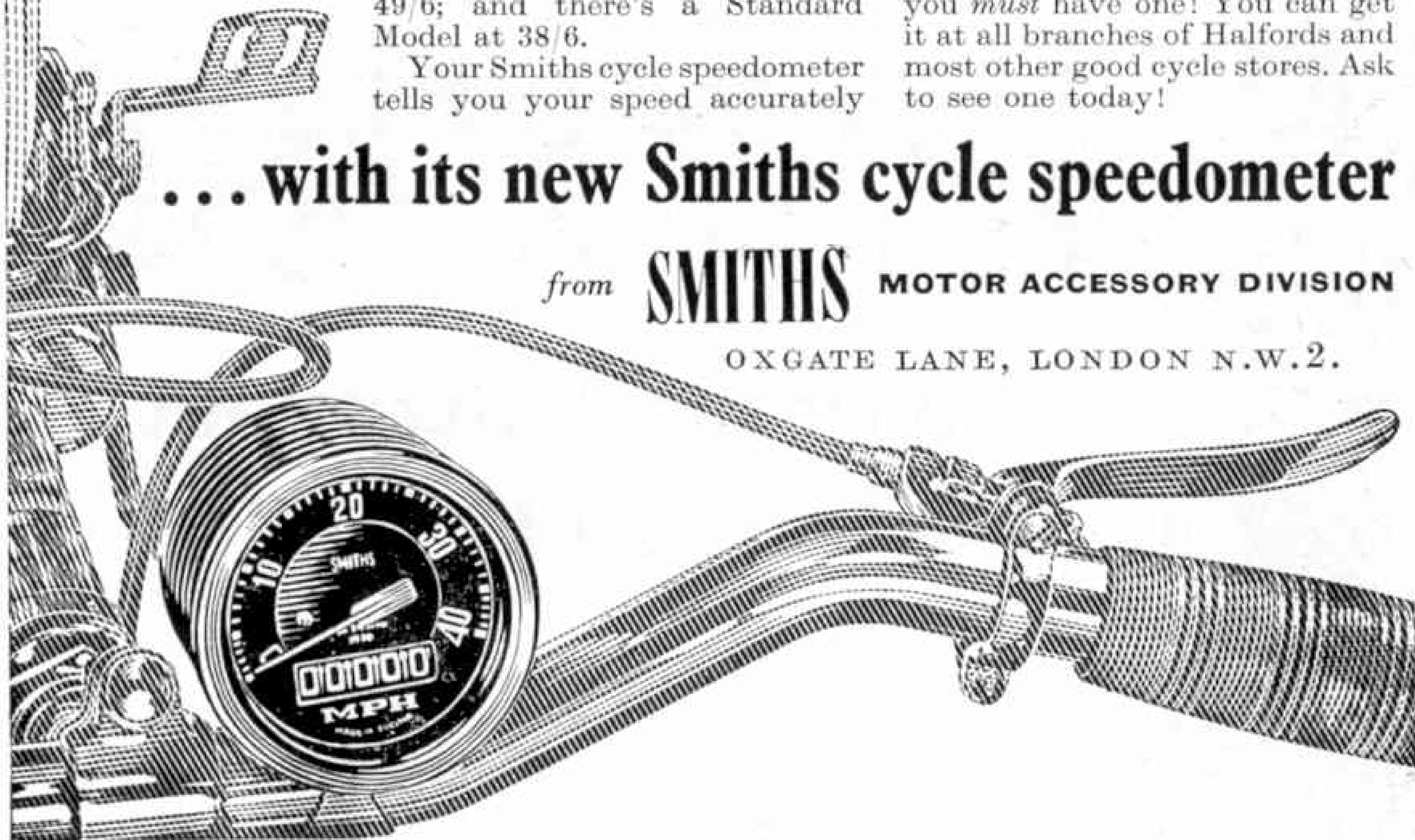
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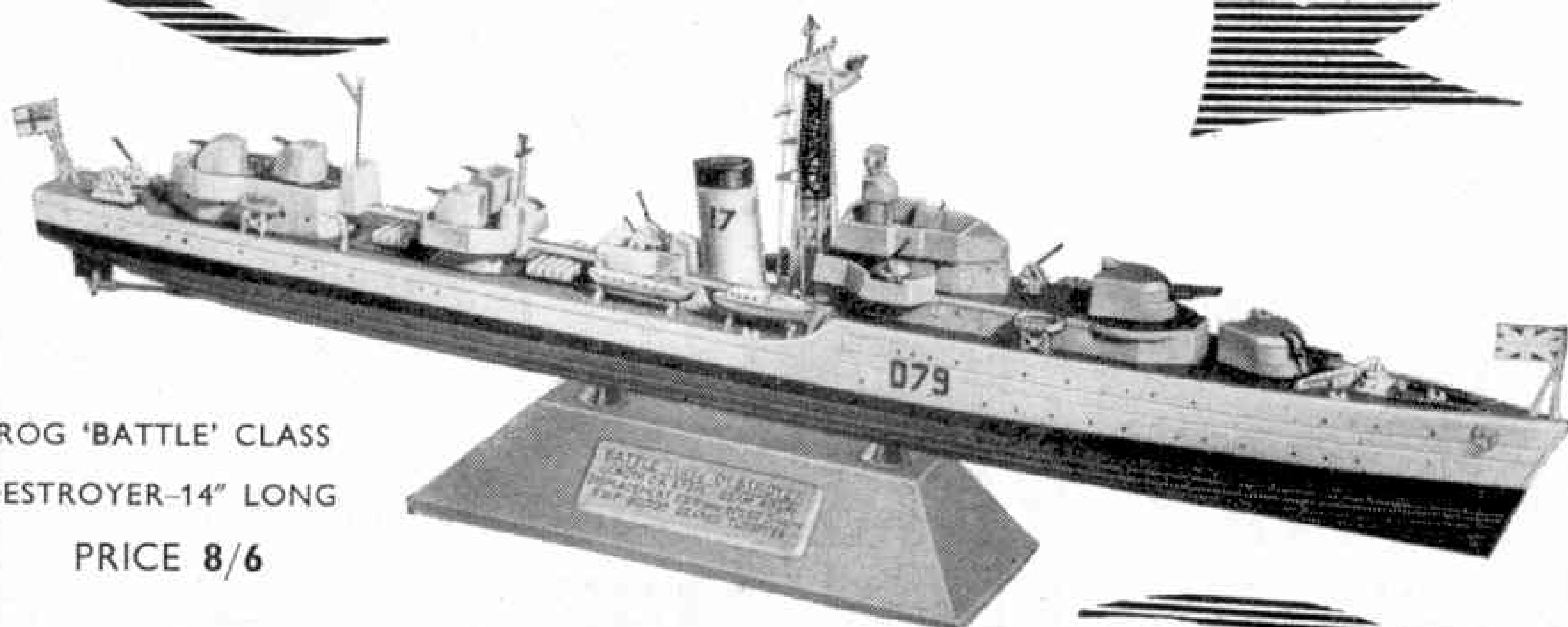
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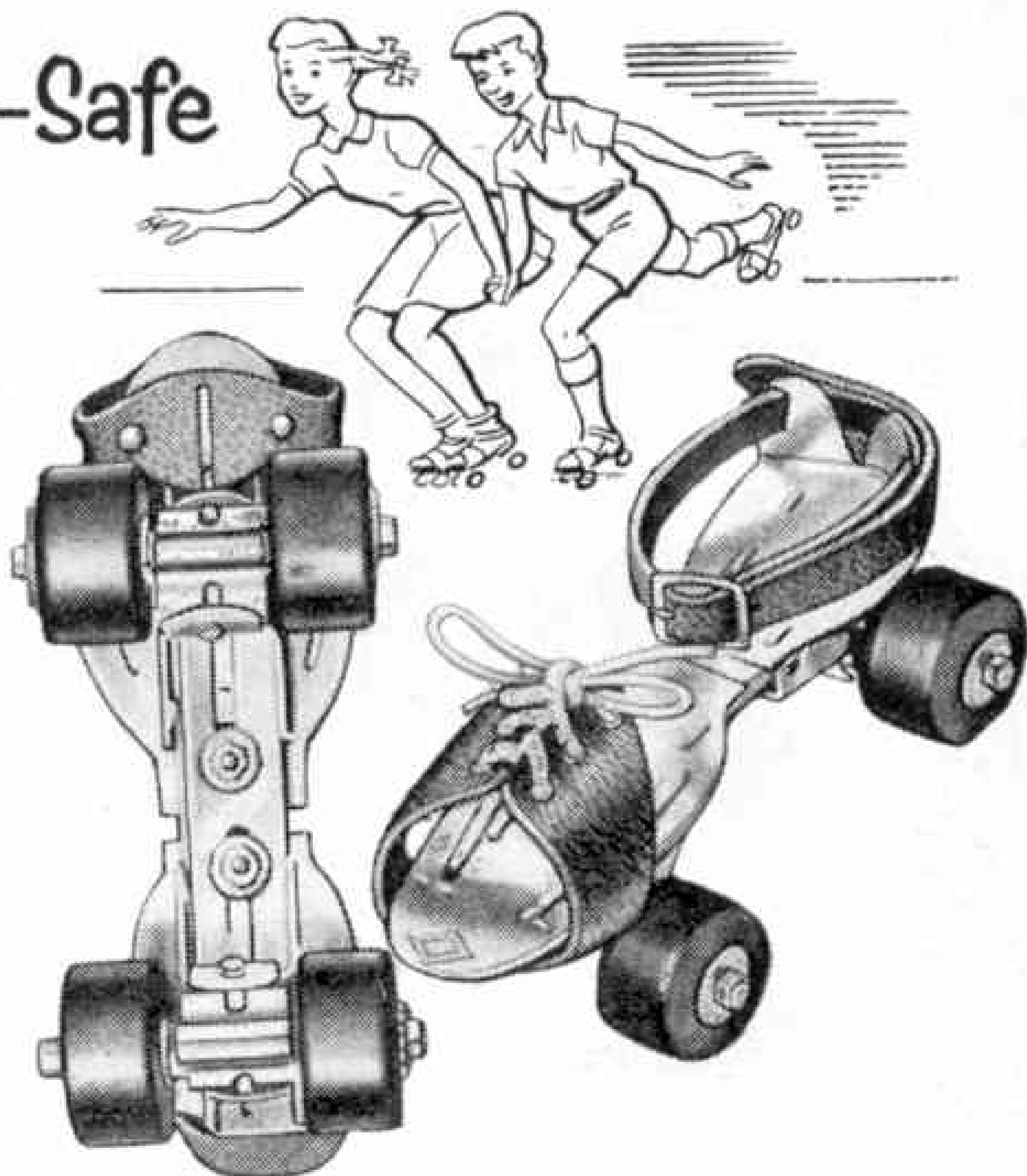
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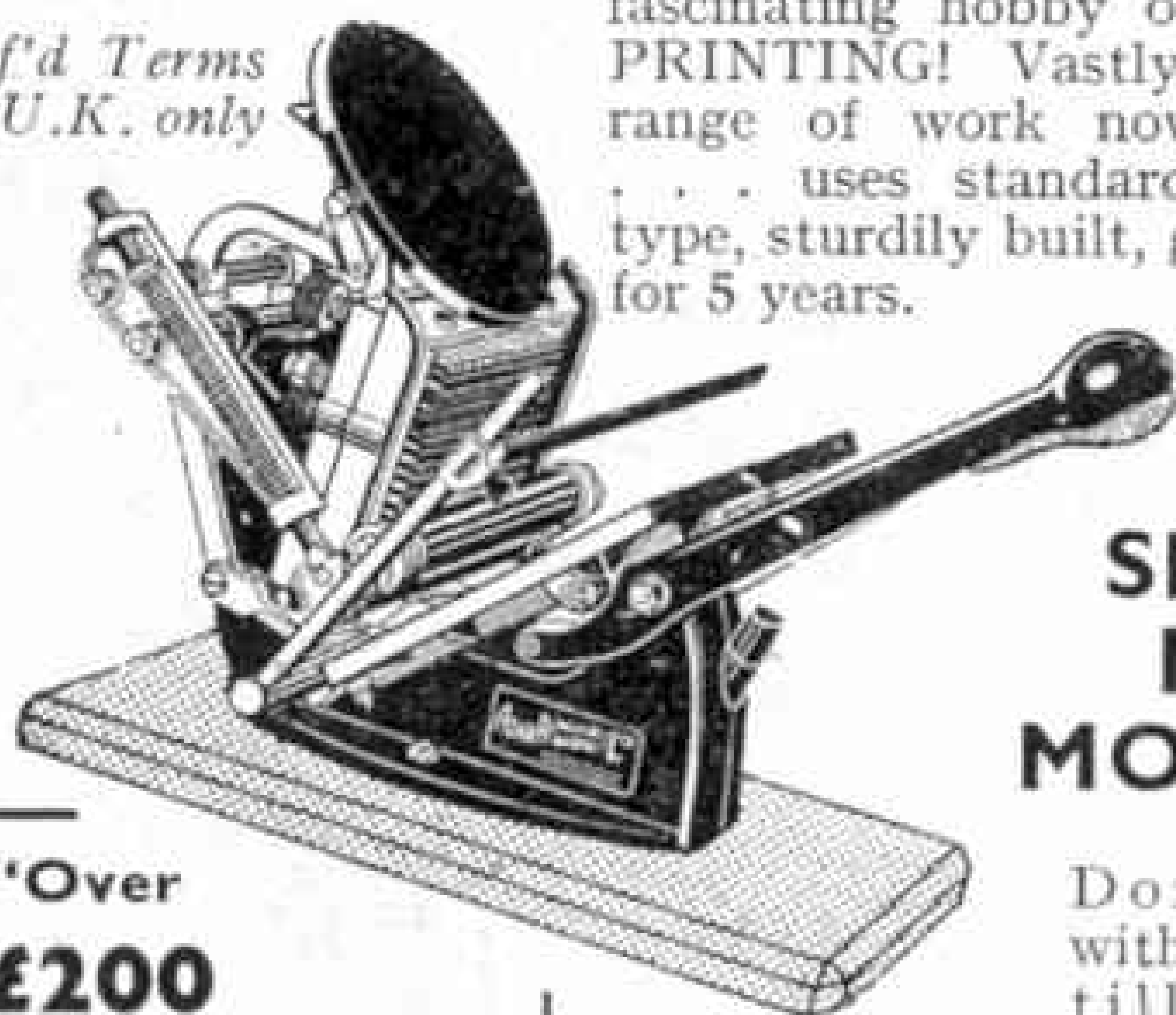


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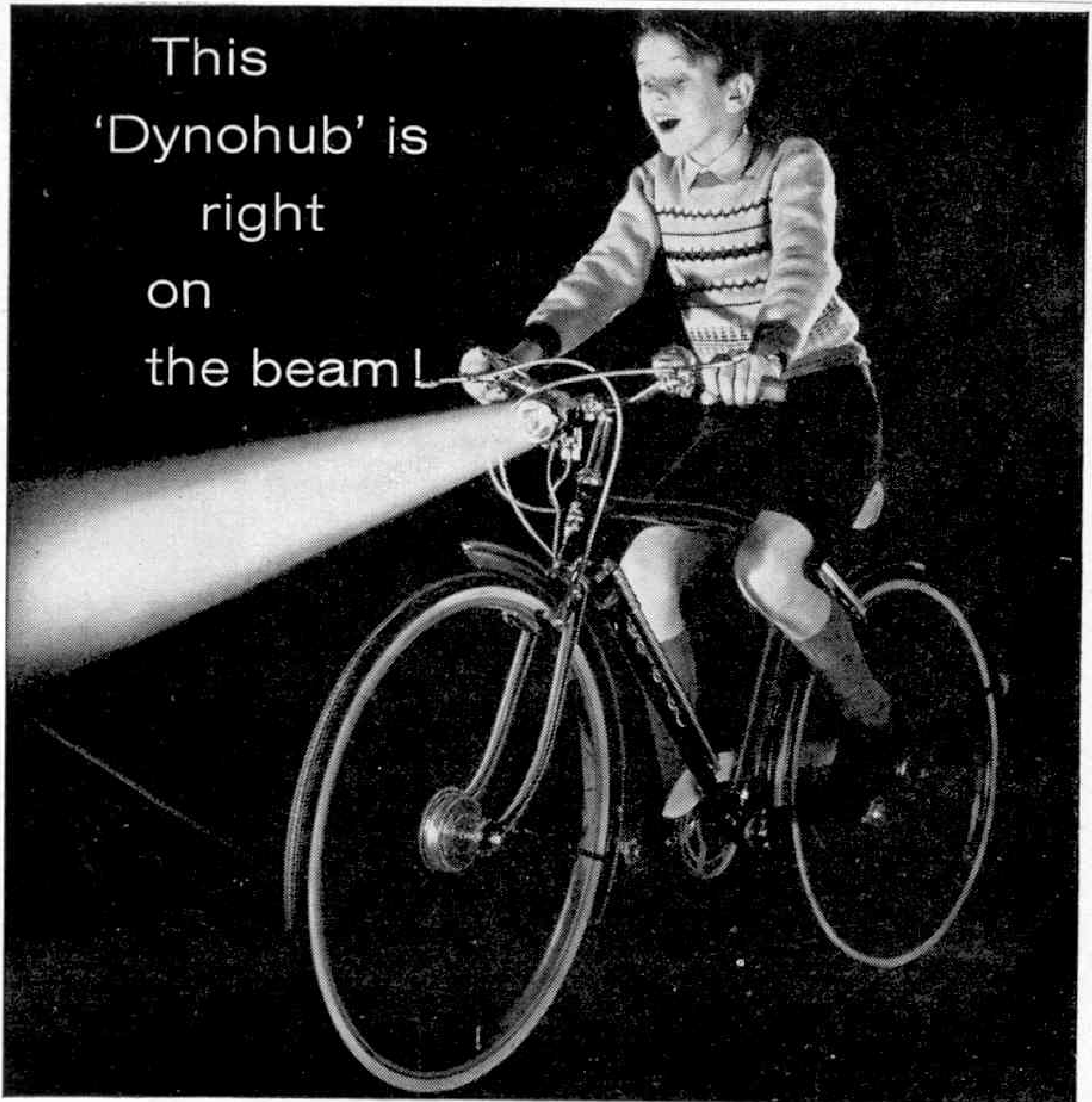
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Next Month: "ON THE FOOTPLATE OF THE 11.15."

MECCANO

MAGAZINE

Editorial Office:
Binns Road
Liverpool 13
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Vol. XLV
No. 3
March 1960

Challenge of the Future

THERE has never been a time since the world began when youth has had such chances as the present age offers.

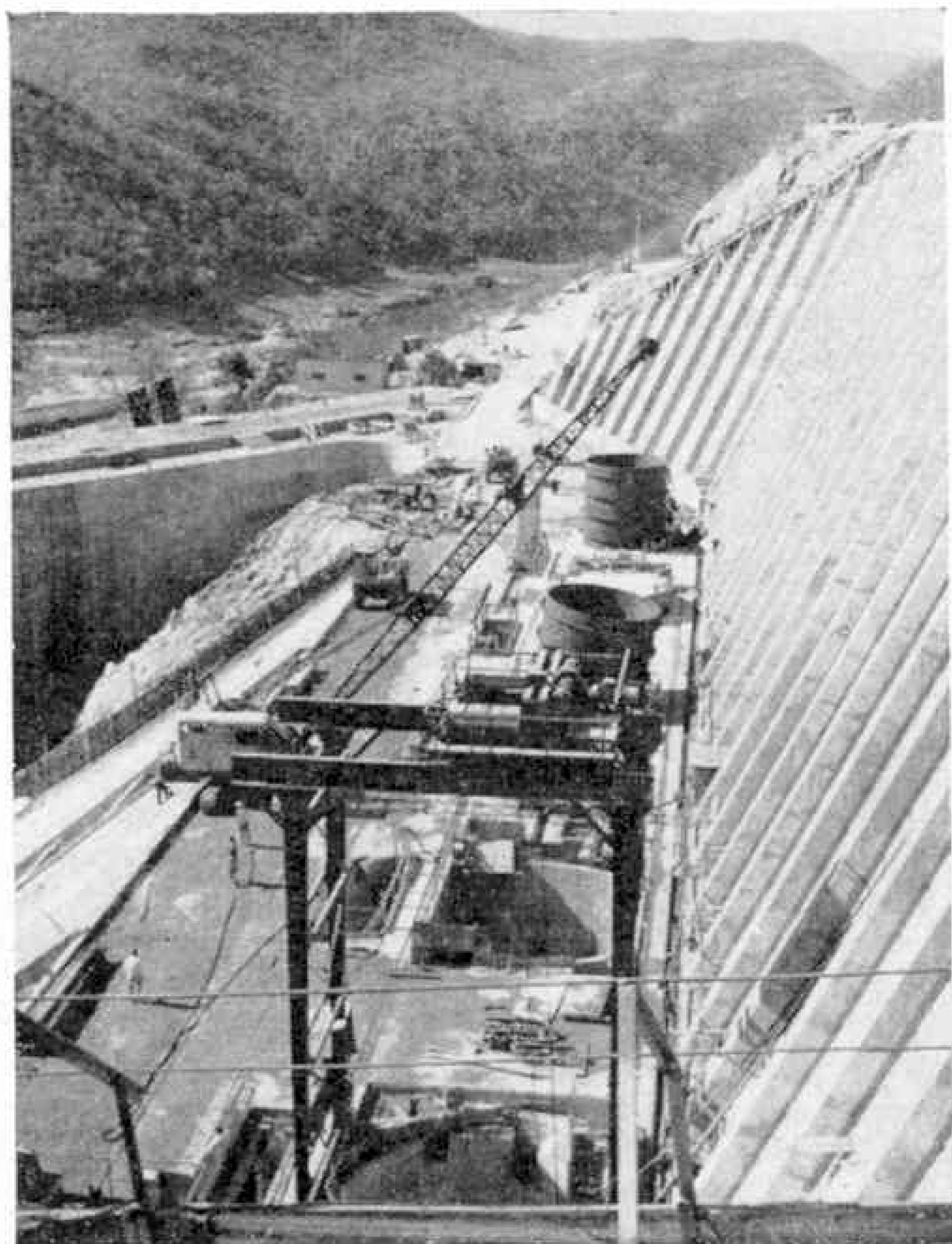
The horizons of the boy who lived in the

of his tribe. The youngster of the first Elizabethan era had a bigger world before him. Ships had probed and battled their way across the oceans; explorers had made their first brave, tentative steps in wild and savage countries; the world had been divided into two parts, the Old and the New—yet, for most English boys it still began and ended within twenty or thirty miles of their own doorstep.

Even in the last century, in spite of the rapid development of electricity, steam, hydraulic power and the internal combustion engine, there was a stricter limit on possible achievements than there is today. Then expansion was chiefly across the surface of the world; now the challenge is from above the globe and below it.

There are endless millions of miles of space to be investigated and the cavernous depths of the sea to be charted and explored. The last few years have seen a stepping up of activities in both these directions; the next few years may bring in their wake a train of events such as has never before been recorded—the conquest of the Moon and the unfolding of the oceans' deepest secrets. And in these events the modern teenagers now advancing to manhood and womanhood may play a vital part.

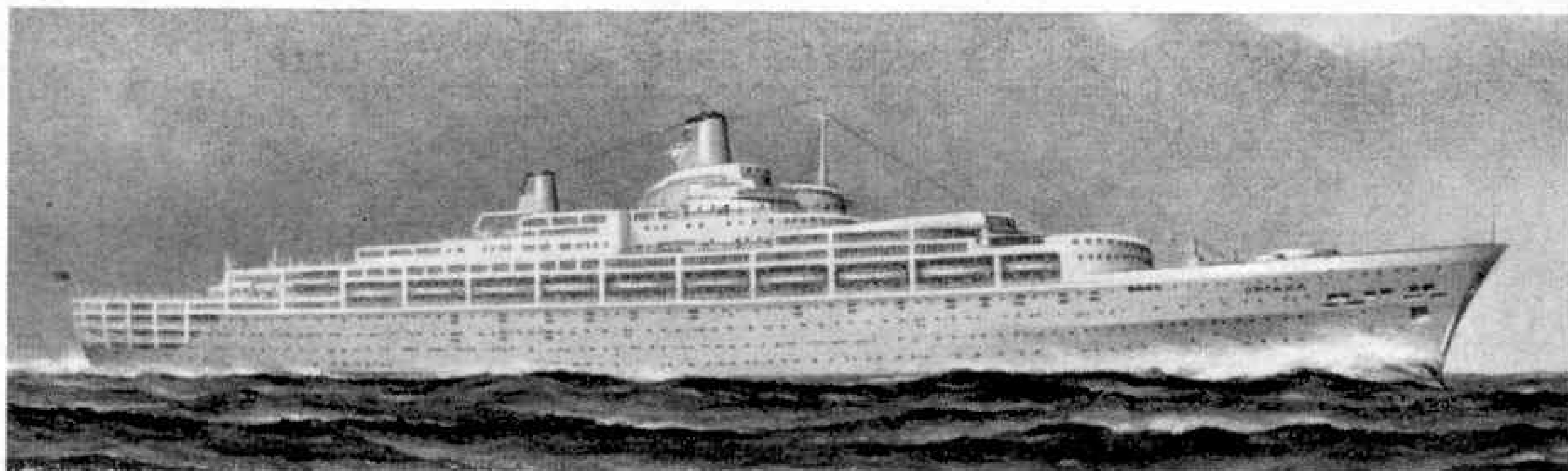
With Britain's traditions behind them, and with new worlds ahead, they have the chance to write themselves into the pages of History.



On page 122 of this issue is a description of a visit to the wonderful Kariba Dam, which will provide electric power from the waters of the mighty Zambesi River. This picture, from a photograph by J. Wade, the author, shows work in progress on the inlets through which water for the turbines flows.

dawn of Time were confined to a few square miles; even as he grew in stature and strength his activities were chiefly limited to hunting for food for himself and others

The Editor



The Orient Line "Oriana"

Largest Passenger Liner Ever Launched in England

ORIANA is the largest British liner built since before the war, and she is also the biggest ever built in an English shipyard. She is also the first liner in which the captain can give the order from the bridge "Full Speed . . . Sideways", for she is the only one yet fitted with propellers that enable her to obey such orders. And she will bring Great Britain and Australia much closer together, for when she takes up service she will reduce the time required to travel between these two members of the Commonwealth from four weeks to three.

The launch of any ship is a moving event, but that of a vessel with all these characteristics naturally is outstanding. It is fitting too that she was launched by H.R.H. Princess Alexandra immediately after her return from the Australian tour that created so much interest. The announcement that she would do this was actually made when she was in Brisbane, from which city her uncle, H.R.H. Duke of Gloucester, launched a predecessor in the fleet of the Orient line, the *Orion*, by radio in 1934.

The Orient Line's new vessel *Oriana* was laid down in September 1957, and the launch took place at the Barrow-in-Furness yard of her builders, Vickers-Armstrongs Ltd., on 3rd November last. She is expected to be completed in September of this year. Her cost will be approximately £14 million, she will have a gross tonnage of 40,000 and a service speed

of 27½ knots. Her total length will be 804 ft. and her engines will have a maximum shaft horse power of 80,000.

Now why has this vessel been built with these dimensions and power? The Orient Line has long been famous for its services through the Mediterranean and the Suez Canal to Australia, and beyond to all parts of the Pacific Ocean, calling at many famous ports in these areas. The present fleet comprises five ships, ranging from the *Orontes*, of 20,000 tons, to the *Orsova*, of 29,000 tons, together with a 37,000-ton

tanker, *Garonne*, which has just been delivered by her builders. When the question of providing a new vessel for the service arose, consideration had to be given to her size and speed in order to

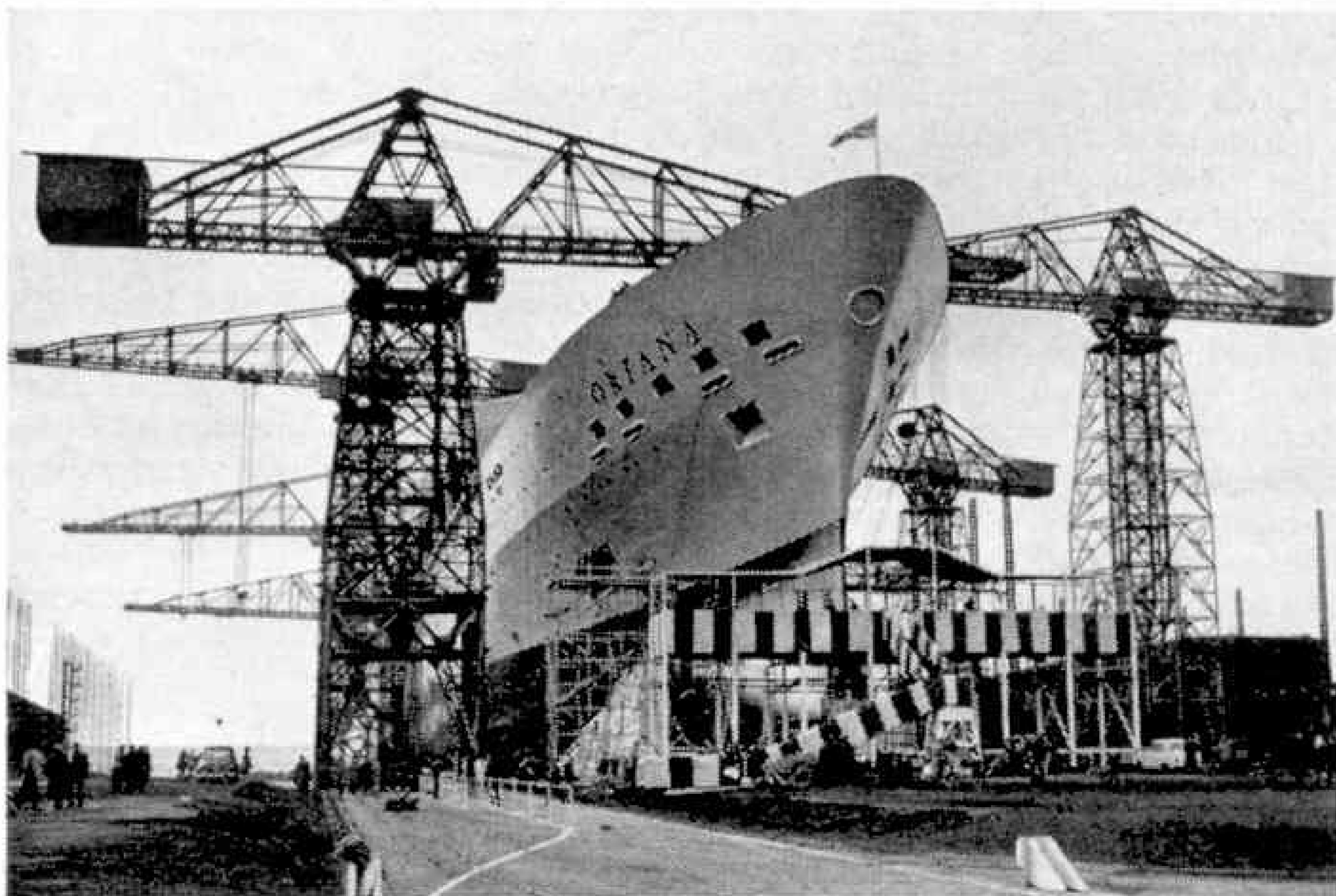
ensure that the service between the regular ports of call of Orient liners could be not only maintained, but also improved.

Greater speed demands more powerful engines and a larger consumption of oil fuel, which, of course, adds to the cost. On the other hand, the shorter time taken up in voyages would help to reduce expenses, and therefore a balance had to be struck. The decision taken was to increase the speed from the 22½ knots of *Orsova*, the largest and most recent of the vessels now in service, to 27½ knots. A great factor in deciding on this particular speed was the fact that with it the voyage timings would allow for the same convenient hours of arrival and departure at ports of call as do

The picture at the head of the page is reproduced from an impression by Edward Becket of what the new Orient liner "Oriana" will look like when she is in service. For information about this fine 40,000-ton liner, and for our illustrations and the photograph on which this month's cover is based, we are indebted to Vickers-Armstrongs Ltd., her builders.

those of the present ships, while reducing the time of passage between London and Sydney by a whole week! A ship to give this speed must have a minimum length of about 800 ft. and engines of 80,000 shaft horse power, and so these figures provide the starting point for the design of *Oriana*.

The illustration at the beginning of this article shows what a handsome vessel the newcomer to the Orient Line will be when in service. She has many interesting features that give her a markedly different appearance from her predecessors. One of the principal of these is the position of the lifeboats, which themselves are interesting in that they are made of fibreglass, which has proved to be an extremely strong and enduring material for this type of craft. They are suspended on a newly developed design of underdeck gravity davit, so that they appear to be housed in compartments in the ship's sides and are at a much lower



Launch Day approaches. The stage from which H.R.H. Princess Alexandra is to launch "*Oriana*" is ready for the ceremony.

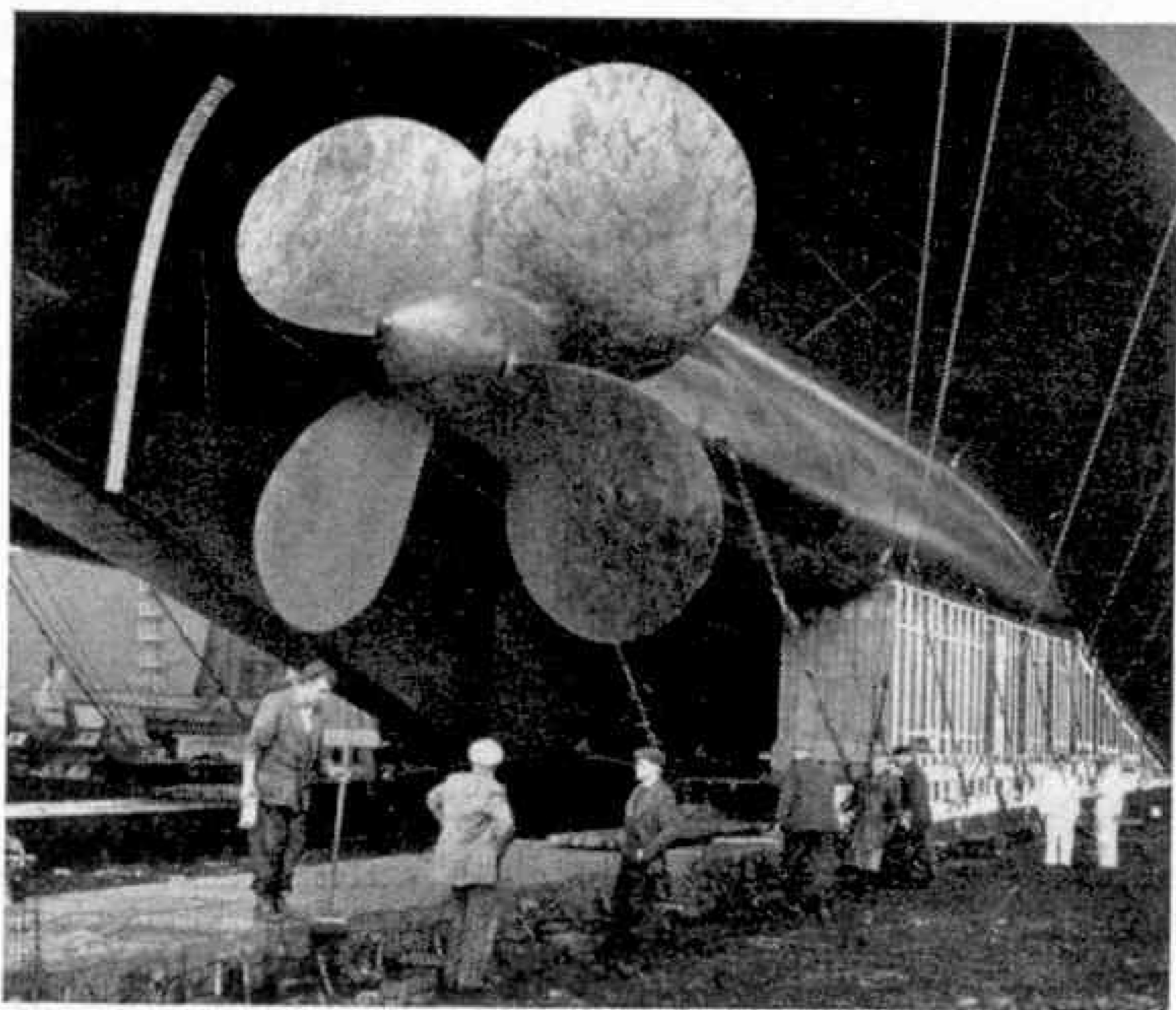
level than has been customary. The time required to lower them in time of emergency is less than with boats in the more usual position previously given them.

Another interesting feature of the outward appearance of the vessel is the second funnel. This is in fact the engine room exhaust vent. The *Orsova* has no mast, but this feature has been reintroduced in *Oriana*, and it supports the twin radar scanners.

Another change is that derrick posts, a very conspicuous feature of previous Orient liners, are absent. They have been replaced by eight electric cranes. The two of these on the forecastle deck are mounted on rails, so that they can be moved from one side of the ship to the other as required.

The new vessel will have a further distinction in that she will have the largest all-welded aluminium superstructure afloat. Over a thousand tons of aluminium have been used in its construction, and this has had the effect of reducing the weight to such an extent that an additional deck has been made possible in order to provide more accommodation.

Much of this aluminium superstructure was built in welded sections in the Vickers-Armstrongs' assembly shop.



One of the twin propellers of "*Oriana*" seen before the launch. On the right can be seen one of the ship's launching cradles.

The largest single unit was the first-class staircase, which weighed 16 tons. Two cranes were used to turn the staircase on the ground before it was lifted by one of the giant cranes alongside the slipway on which the vessel was built, swung over the ship and lowered into its position. Five decks, two bridge decks and all upper works, complete with internal structures, were built of aluminium, and this metal also replaced steel in the stiffeners in the ship's superstructure. Incidentally, electric welding was adopted throughout the *Oriana's* hull and superstructure.

Two Denny-Brown stabilisers are fitted to counteract rolling. They have fin areas of 122 square ft. each, the main fin having a working angle of 20 deg., and will contribute immensely to the comfort and well-being of all those on board — particularly those not accustomed to ship motions!

Oriana can carry 638 first-class passengers and 1,496 tourist class, while her crew numbers 903. The passenger accommodation is of a very high standard indeed. The first-class accommodation is arranged over the midship part of four of the uppermost decks. It includes dining room and lounges, a magnificent Observation Lounge providing an uninterrupted view ahead from the forward end of the bridge structure. First-class cabin accommodation ranges from the luxurious flat, with its own sitting room, and special state rooms with their own verandahs, to the usual single and two-berth rooms.

Tourist class accommodation is distributed over the midship portions of five decks. Passengers in this class are to be accommodated entirely in two and four-berth cabins, and ample facilities are provided for all classes for amusement, recreation and rest, necessities for those who live in a floating hotel from which there is no escape during runs between ports. Passengers on *Oriana* should certainly be comfortable and happy.

Special consideration has been given to crew accommodation. All officers are berthed in single cabins and the Petty Officers, Leading Hands and Ratings have single-berth and two-berth rooms.

The vessel is to be propelled by twin screws, driven through double reduction gearing and by a set of steam turbines. The normal service shaft horse power is 65,000 at 147 propeller revolutions a minute; the total maximum designed shaft horse power of 80,000 is developed at 157.5 propeller revolutions a minute. Steam is supplied

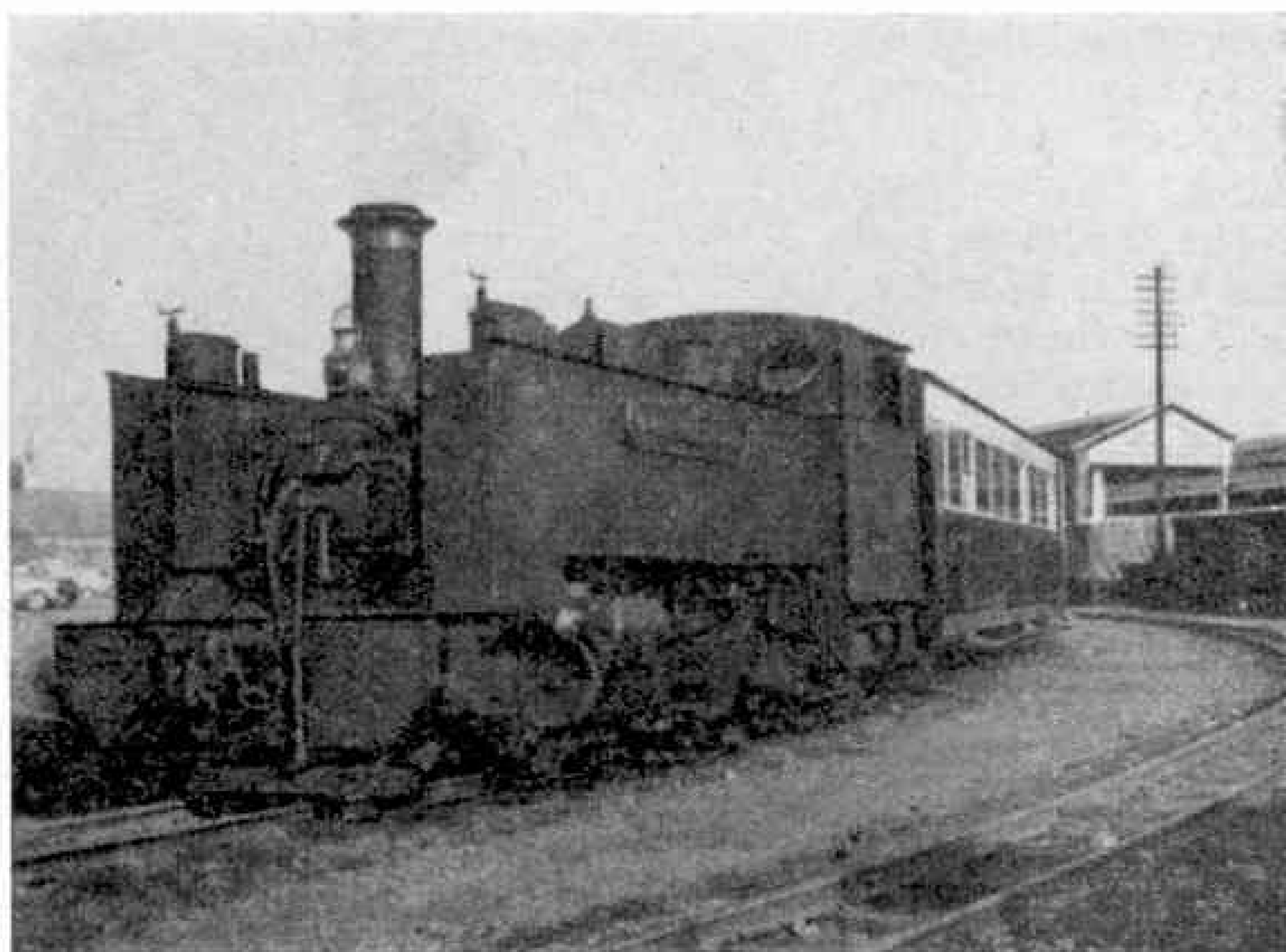


"*Oriana*" is towed to the fitting-out berth after launching.

to the turbines at a pressure of 700 lb. per sq. in., and a temperature of 950 deg. F. by four Foster Wheeler oil-fired boilers.

The propellers that give *Oriana* sideways movement when required are fitted within circular steel casings arranged across and below the ship at the bow and stern, at an appropriate depth below the waterline. Each installation consists of two units that may be operated singly or together, and all are remotely controlled from the bridge, where control pedestals are arranged both in the centre and on the wings. These propellers are particularly valuable when docking, and undocking, and for manœuvring in close waters.

In *Oriana* there are about 2,500 sockets and 15,000 lighting fittings in the passenger quarters alone and about 350 miles of electric cable altogether.



The Vale of Rheidol Railway

British Railways' Only Narrow-Gauge Passenger Line

By Harold Muir

IN common with many other parts of Wales, Cardiganshire had a boom in mining at the turn of the century. Deposits of different sizes of iron and lead ores, and of other valuable minerals, were found in the Rheidol Valley. Shafts were sunk without delay, and probably without much thought of the expense and difficulty of transportation of the extracted metals. Owners of foundry works in Aberystwyth were concerned at this, and at a meeting in the town it was generally agreed that the most economical and convenient method of conveying the ores to the town was by rail. Thus the Vale of Rheidol Railway, as it was to be known, came into existence.

The "two-foot" gauge, more accurately 1 ft. 11½ in., was selected for the line, being preferred to the standard gauge by reason of the rugged nature of the terrain, and the many short radius curves that had to be followed in construction. The Festiniog Railway had used the same gauge many years previously, with satisfactory results, and this may also have had some bearing on the selection of the "two-foot" gauge.

The line was built mainly on the south side of the wide Rheidol Valley, with termini at Aberystwyth and Devil's Bridge. The decision to use Devil's Bridge as the eastern terminus was to prove a wise step, for though in the early days of the line passengers were only of secondary

importance, fifty years later their visits to the famous beauty spot by means of the railway were to prove the life-breath of the line.

The first train ran on the line in 1902. In 1913 the railway was taken over by the Cambrian Railways, and became absorbed with them into the Great Western system in 1923. In 1924 a short branch to the harbour at Aberystwyth was closed owing to the decline of the mineral traffic. The transition was now complete, and the Rheidol had become essentially a pleasure line, with a negligible traffic in goods and minerals.

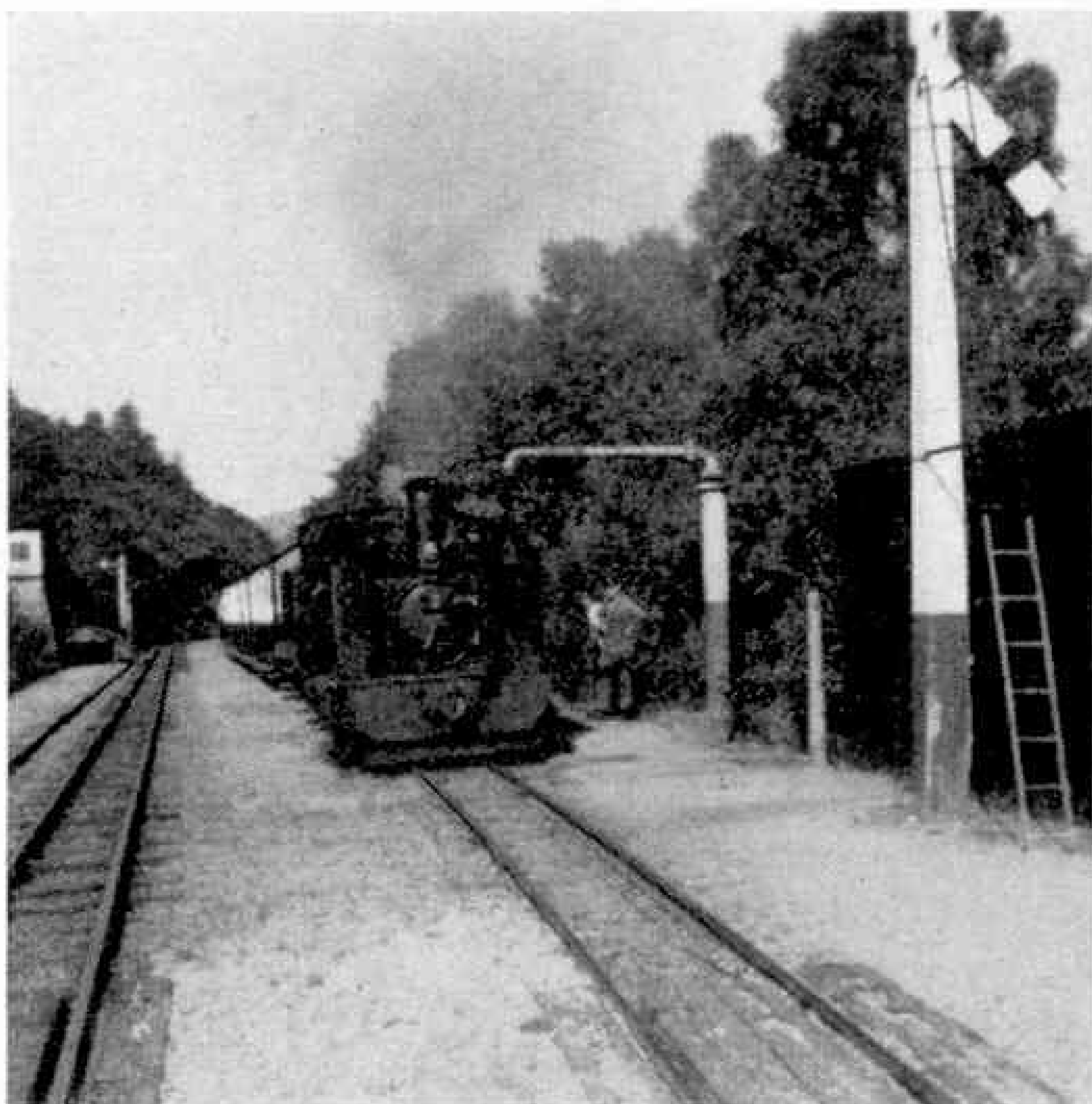
The two original locomotives, both 2-6-2 Tanks, were built by Messrs. Davies and Metcalfe, and the design proved so successful that when the Great Western took over, they built two new locomotives of almost identical design for use on the line. One of the original locomotives was withdrawn in 1932, but the other and the two from Swindon still give sterling service. The latter are numbered 7 and 8, and bear the names *Owain Glyndŵr* and *Llywelyn* respectively. The remaining original is numbered 9 and named *Prince of Wales*. The three are housed in their own running shed at Aberystwyth. This is a small corrugated iron building just large enough to accommodate them.

A pleasing feature of the Vale of Rheidol

Railway is the immaculate condition of all the rolling stock, a shining example to some of its standard-gauge contemporaries. The carriage stock is painted in the chocolate and cream of the former Great Western, and the locomotives bear the familiar dark green livery of that Company.

Probably many of the holiday-makers who visit Aberystwyth are completely unaware of the existence of the Rheidol Line, as its terminus is separate from the main line station. To reach it one has to walk half the length of one of the main-line platforms, leave by a side gate and thence enter the narrow-gauge yard. Nevertheless, enough passengers are forthcoming to allow a service of three trains daily each way during the summer months.

The line is closed in the winter, there being insufficient local traffic to warrant a service. The journey from Aberystwyth to Devil's Bridge takes one hour for the distance of just under twelve miles. This might seem a very slow trip until it is realised that the terminus at Aberystwyth is but fourteen feet above sea level, while that at Devil's Bridge is almost seven hundred.



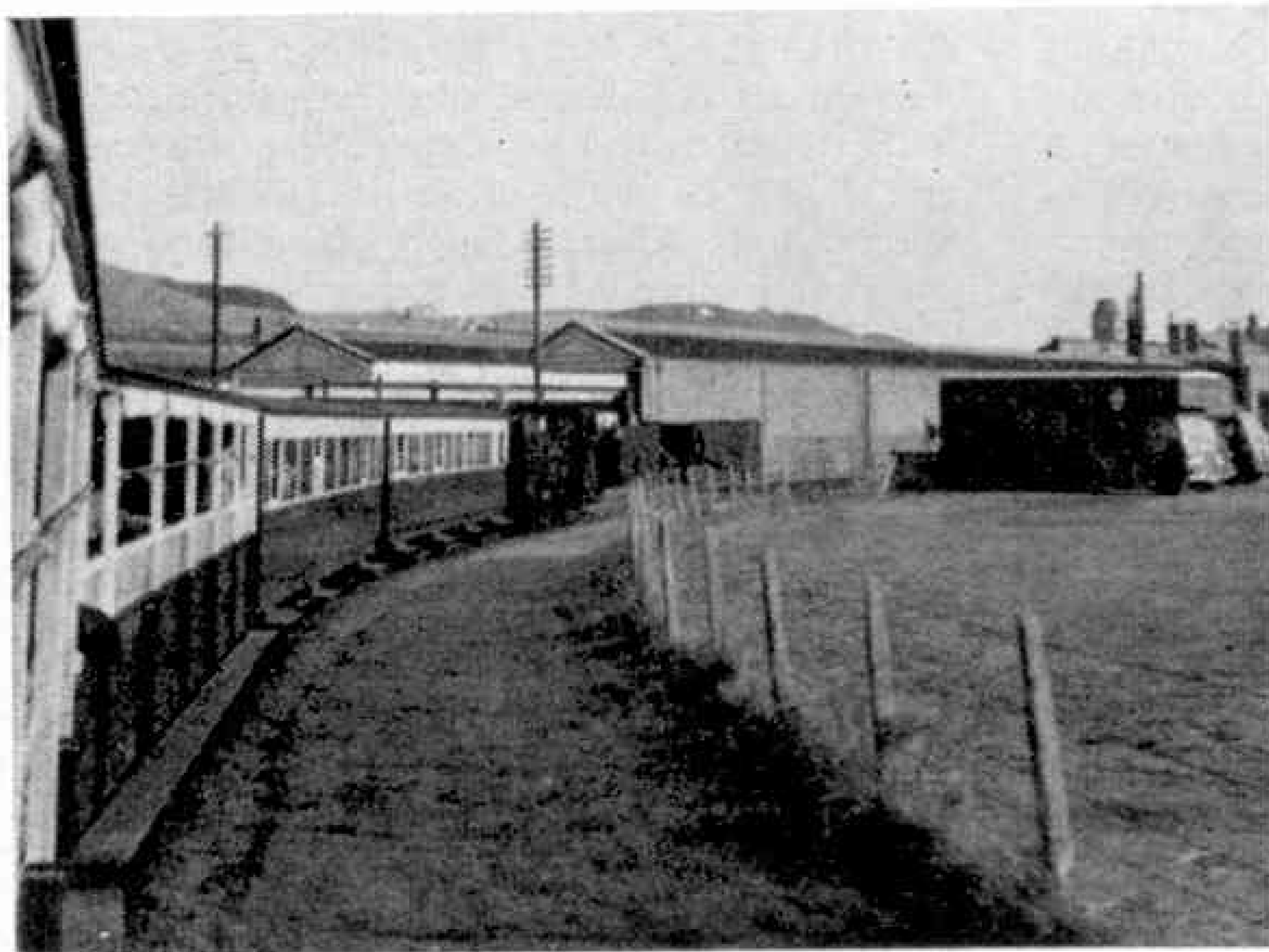
On the opposite page is a Vale of Rheidol train ready to leave Aberystwyth for Devil's Bridge, headed by No. 7 "Owain Glyndŵr". Above, the locomotive is seen taking water at the intermediate station of Aberffwd.

platforms at any of the stations on the line, a quite common feature with narrow-gauge systems.

At last our train pulled into the yard. The carriages were of two types, fully closed saloons and open-above-the-waist observation cars, which have pull down canvas blinds for use in inclement weather.

Promptly at 2.30 p.m. the guard blew his whistle, and the powerful little locomotive pulled away, and across a road by way of an un-gated level crossing. On the right could be seen the carriage sidings and the site of the terminus until 1925, when the track was extended to the position it now occupies beside the main-line station. A little farther on, to the right, is the locomotive shed and water tank.

The line swings sharply to the left at this point to run along the north bank of the river Rheidol, and under a viaduct carrying the Western Region main line to Lampeter. Shortly afterwards we saw the exchange sidings, where coal is transferred from the standard gauge into narrow-gauge wagons.



A view of the terminal of the Vale of Rheidol Railway at Aberystwyth, near the Western Region main line station.

On the day I visited the railway, a large crowd in the narrow-gauge yard awaited the arrival of the afternoon train from the sidings. The layout in the terminus consists of a double-track, in the form of the running track plus a run-round loop. There are no

In just over a mile, and after seven minutes running time, the first stop was made at Llanbadarn. Beyond the station shelter, on a hill top to the north, can be seen the magnificent building that houses the National Library of Wales. On leaving Llanbadarn, another un-gated crossing is traversed, then the river is crossed on a low wooden viaduct. We passed through Glanrafon Halt, and the next stop was at Capel Bangor, $4\frac{1}{2}$ miles from Aberystwyth. Here we saw the carriage shed for the line, a long corrugated iron building that houses some of the passenger stock during the winter.

On leaving Capel Bangor, the character of the line changes. Up to this point the track had followed an almost level course through meadow land, but now the track was laid on a ledge cut into the side of the hills, and was to remain so for the rest of the journey. The bark of the locomotive's exhaust was more pronounced than before as it tackled the stiffening gradient, and with each succeeding yard the river was farther below, as we climbed steadily up the tree-lined hillside. The work of the locomotive is made harder by reason of the sharp curves which it has to negotiate while climbing. At many points *en route*, the curves are so sharp and continuous that passengers in the rear might well think that the train is attempting to turn a full circle, and catch its own tail!

Nantyrnen Halt was reached and passed, and a mile farther on, $7\frac{1}{2}$ miles from Aberystwyth, we drew into Aberffrwd. On the station name board are the words *200 feet above sea level*, an indication that a harder climb still awaited us. The locomotive took on water from the lineside tank, while the passengers admired the rock garden opposite the station shelter, which has as its central feature the words *Welcome to the Vale of Rheidol*, picked out in white pebbles.

On leaving Aberffrwd, the track sweeps round in a long left-hand curve, which enabled us to see the other side of the station we had just left, and the village below it. The line was now running through the area in which most of the mines were situated, and still climbing, swinging all the while through countless sharp curves.

Across the Valley, the famous Rheidol Falls came into view. The waterfall

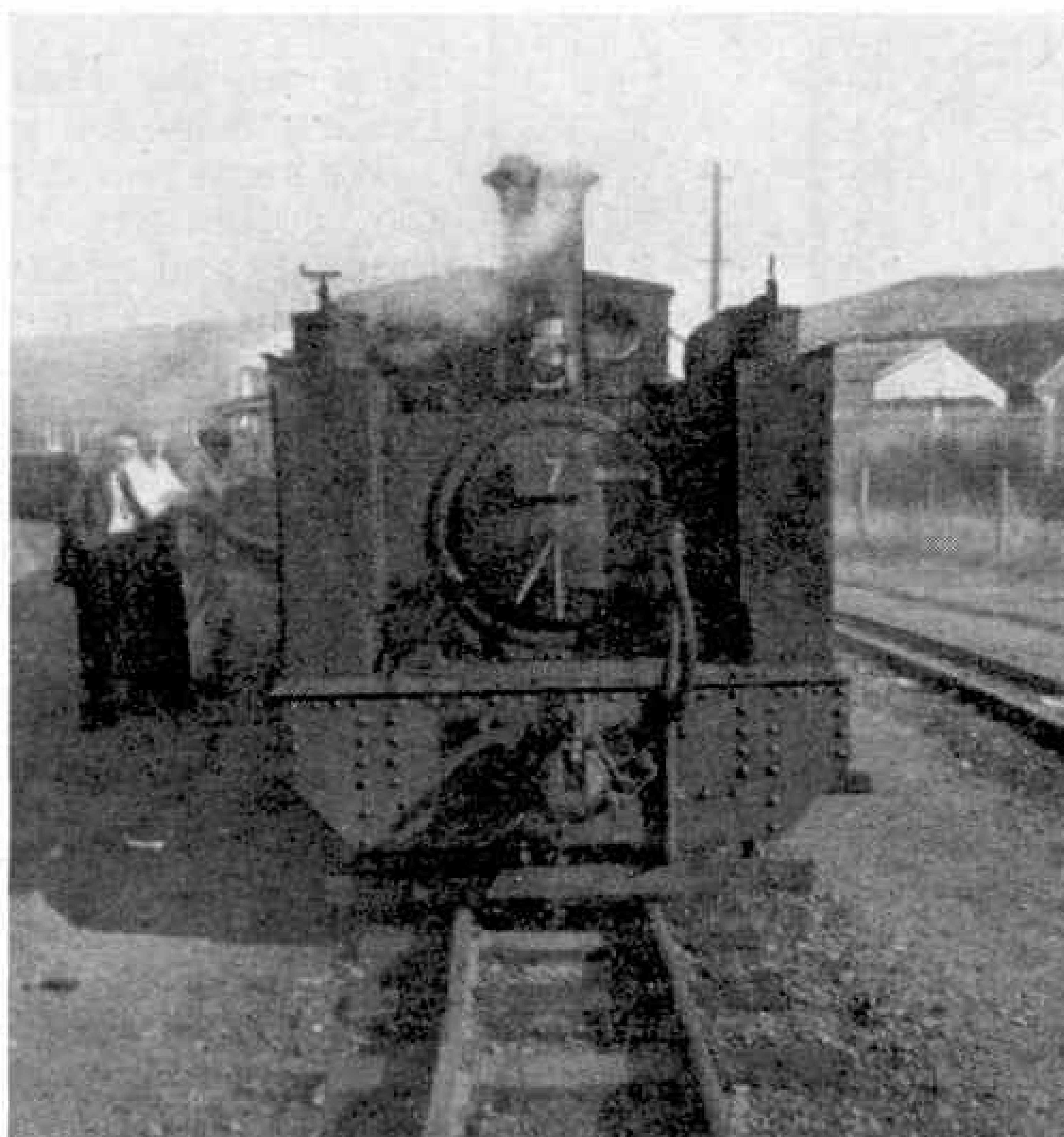
cascades from the top of the hills that form the northern wall of the Valley to join the river far below. A halt is situated here for the use of visitors to the Falls, but trains rarely stop there now, as can also be said of the next halt, at Rhiwfron. In the hey-day of the mines, an overhead ropeway fed ore from the far side of the Valley to a loading siding at Rhiwfron.

Our journey was now almost over. The train snaked through

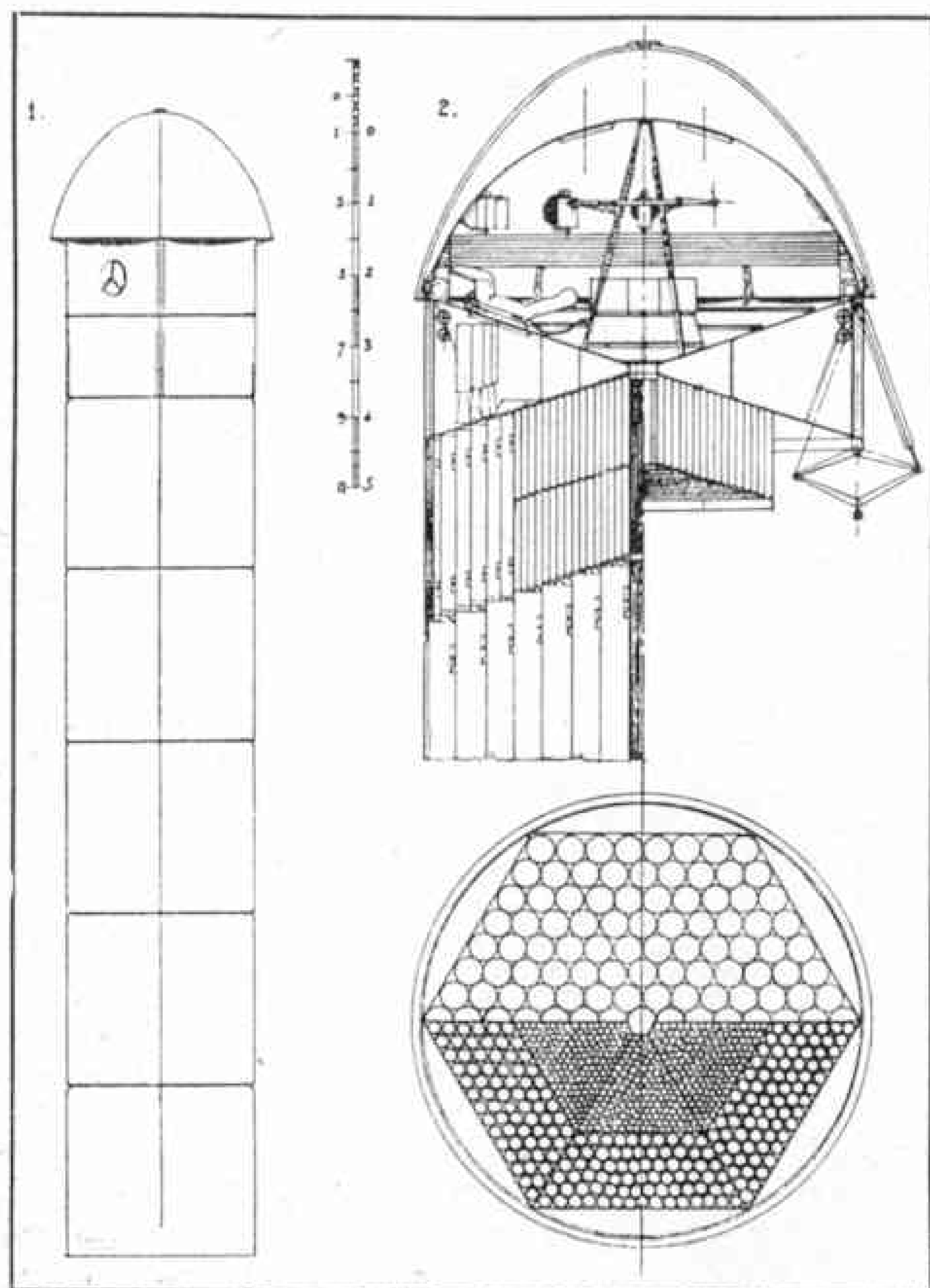
more curves and into a rock cutting, where there is a water tank close by a bridge carrying a footpath over the line. On passing under this bridge, the line fans out into five tracks to form the eastern terminus, Devil's Bridge. Of the tracks, only two are in regular use, the other three forming the almost derelict goods yard. A board attached to the station building proudly proclaimed the fact that we had attained the height of 680 feet above sea level. This had been accomplished in just under 12 miles.

A few minutes walk from the station is the fabulous Devil's Bridge itself. Actually three bridges of greatly varying vintages cross the gorge over the "punch-bowl", a natural rock basin formed by the passage of water over its surface for many centuries.

We returned to the station later to repeat, in reverse, the wonderful trip on British Railways' only passenger-carrying narrow-gauge line, a unique experience for lovers of fine scenery and historic railway lore alike.



A head-on view of "Owain Glyndŵr" at Aberystwyth.



An old-timer—the first British Interplanetary Society's design for a man-carrying Moon rocket. It was intended to be propelled by batches of solid propellant rockets, the arrangement of which can be seen here.

Then and Now

It is unfortunately a rare occasion for me to report on British space news, but this month there are two items worthy of note. Just twenty-one years ago, in early 1939, the British Interplanetary Society published its first plans for a man-carrying Moon rocket. This received great publicity. It was indeed one of the most detailed schemes published at that date, and a study of it reveals some surprisingly modern details.

As can be seen from the drawing on this page, the rocket was a simple cylinder surmounted by a small cabin—a far cry from the streamlined monsters with rows of portholes, driven by unknown propellents that were all the rage in the thirties. Solid-propellant rockets were to be used and these were to be dropped off batch by batch as they became exhausted.

Aerodynamic heating was taken into account and the cabin was protected by a ceramic coated carapace, or shell, just like modern nose cones in shape and construction. Two men were to be carried, and the six-step vehicle was intended to take

Space Notes

By

J. Humphries, B.Sc.(Eng.),
A.M.I.Mech.E., A.F.R.Ae.S.

them to the Moon and back, return landing being by parachute.

We know now that the design was much too optimistic, but undoubtedly the thought and study that went into it helped to pave the way for later projects, including the latest British design. This is the Armstrong-Whitworth man-carrying satellite, which has one thing in common with the earlier B.I.S. design—it is another "first", actually the first space project to be officially proposed by a British firm.

The A.W.A. proposal is a satellite to carry two men into an elliptical orbit reaching 700 miles above the Earth at its highest point, which is called its apogee, and 80 miles at its lowest point, or perigee. Calculations and tests have shown that the best shape for a glide return to Earth is a pyramid brought back into the atmosphere with the nose well up. This would not only allow the high drag of the delta wing to slow the vehicle down in the extremely rarefied upper atmosphere, but would also ensure that the underside absorbed the worst of the heat, thus giving protection to the crew in the cabin on top.

As it is unlikely that the landing could be made at a prepared airfield, it is planned to jettison the cabin at a reasonable height when the airspeed is low and to land it by parachute, just as in the earlier B.I.S. design.

A winged satellite presents some difficulties in mounting on top of its launcher. The latter should be a 100-ft. high three-stage rocket weighing 150 tons, and if just mounted on top by itself the wings of the satellite would cause a high offset force on the nose of the rocket, which would require an unacceptable amount of correction from the guidance equipment. The A.W.A. solution to this problem is to mount an "image" vehicle in addition to the real satellite. This would produce the same side force as the satellite but in the opposite direction; the two forces would thus balance each other out. The image

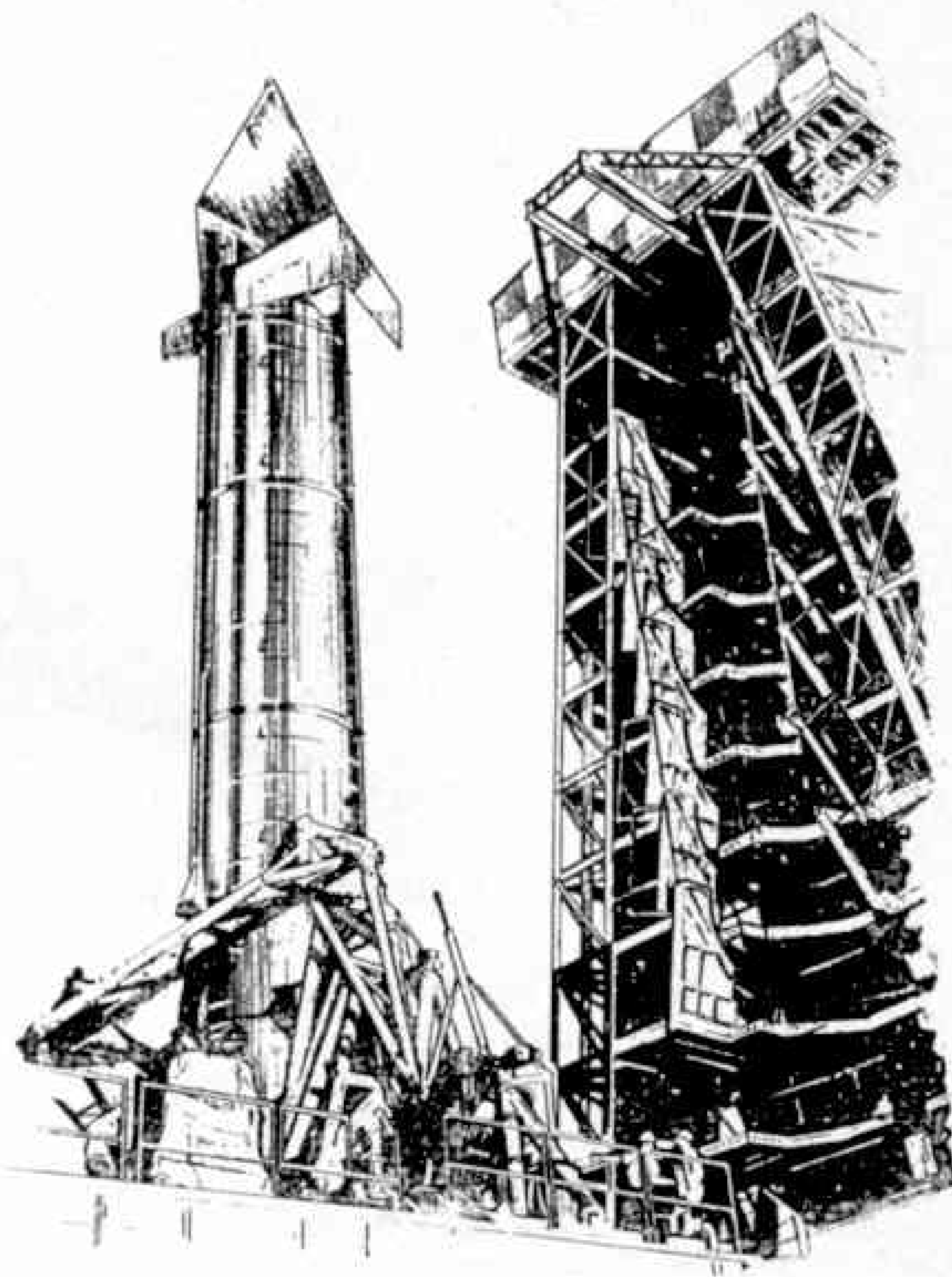
need not be wasted weight, but might be used as a propellant tank.

Getting Back

Coming down safely through the atmosphere after a journey into space has long been recognised as a major problem. From a satellite orbit the re-entry speed will be 5 miles per second, and from a trip to the Moon or planets 7 miles per second or even faster. In theory one could slow down by firing the rocket motors in a reverse direction, but generally speaking this would be impossibly wasteful of propellents and the alternative of using the air's resistance to slow one down must be adopted.

However one comes down, the heat generated will be high and one of several methods must be used to reduce the temperature. In the A.W.A. project described above the wing would be made of steel that can withstand high temperatures, and thick enough to absorb all the heat without melting; this is known as the "heat sink" method. An alternative is for the returning vehicle to be covered with a layer of material, perhaps a special plastic, that will vapourise and absorb a great deal of heat in so doing; this is known as "ablation".

For return at the highest speeds, involving a fairly prolonged stay in the atmosphere, "radiation cooling" can be used. In this scheme a material capable of withstanding a very high temperature is used for the skin, and as it is heated up by



Armstrong-Whitworth's "pyramid-in-the-sky" on its launching vehicle. This could easily be Britain's first manned space project. Photograph, courtesy Hawker Siddeley Aviation Ltd.

the air it radiates some of the heat back into the surrounding atmosphere.

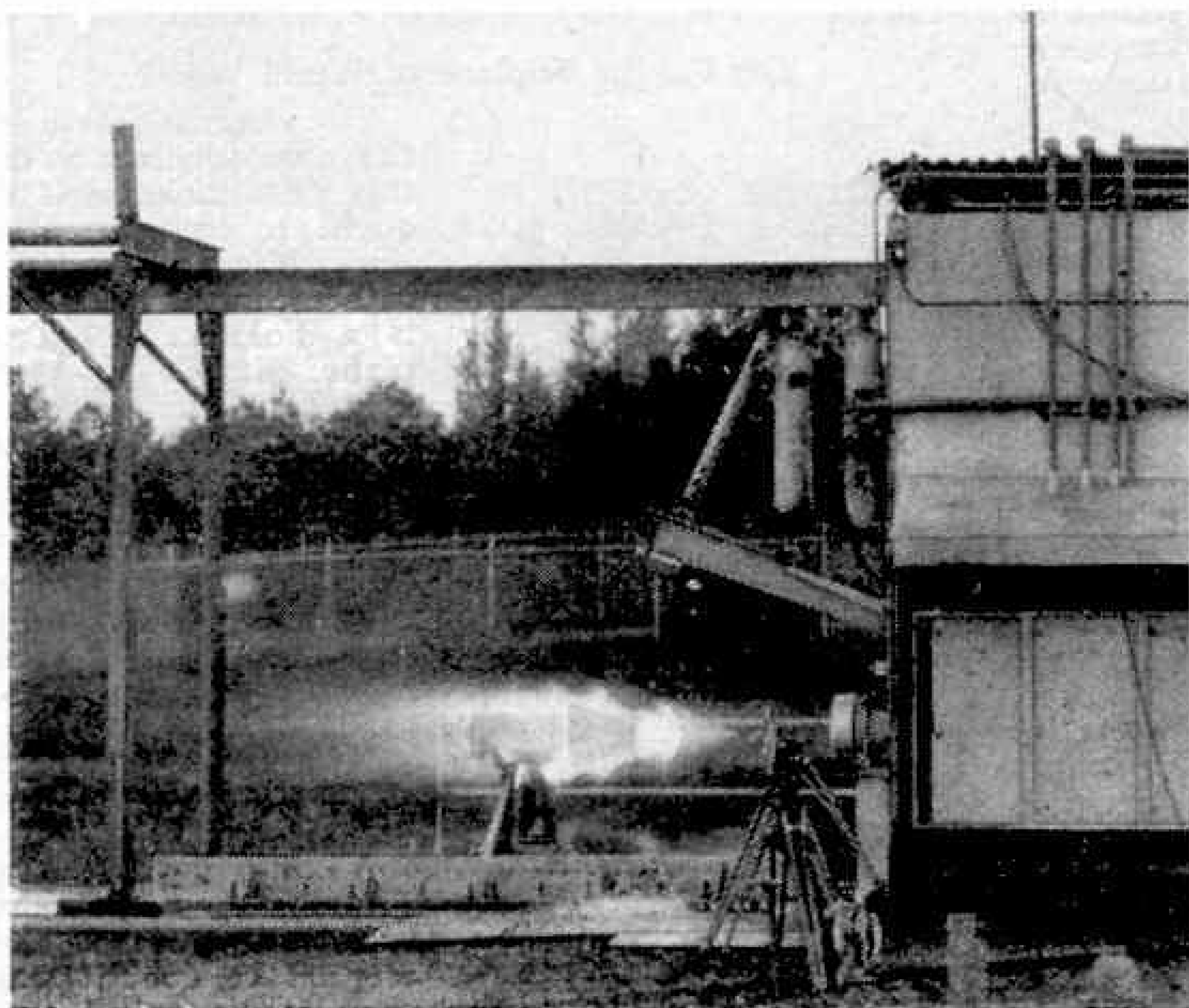
The last method is "transpiration cooling" in which a liquid is forced through small holes on the vehicle's surface and is evaporated, thus taking heat away with it.

Whichever of these methods is chosen, both the material and design of vehicle must be tested in very rigorous conditions. One of the most convenient sources of hot gases at a relatively high speed for periods of minutes at a time is the rocket motor. Samples of new materials or models of nose cones can be placed in the jet and tested to destruction.

Monkey Business

It has been found that, in some respects, sending monkeys up in satellites will pose more problems than sending up men. Drinking in zero-gravity conditions is quite easy for men—a squeeze-bottle is sufficient—but monkeys have to be provided with solid "drink". A special gelatin mixture which contains 80 per cent water, and is packed with

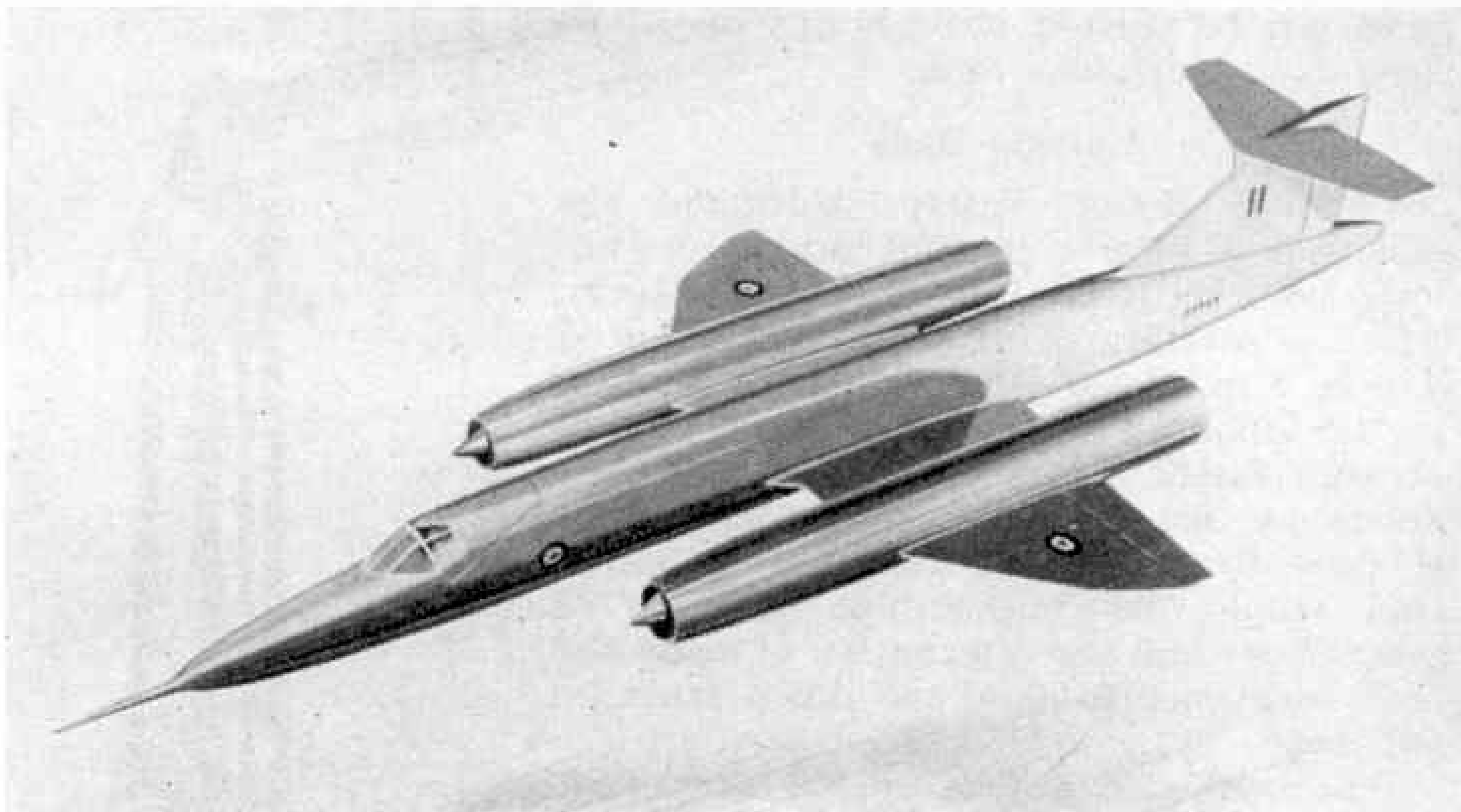
(Continued on page 160)



A model of a long-range missile nose cone being blasted in a test in the jet of a special rocket motor. Photograph, courtesy U.S. Army Ballistic Missile Agency.

Air News

By
John W. R.
Taylor



Britain's Fastest Aeroplane

Taking shape at Filton is the first Bristol 188 single-seat research aircraft, an artist's impression of which appears above. No details of its estimated performance have been given officially, but it is expected to have a top speed of 1,500–1,800 m.p.h., and to be the fastest aeroplane in the world except for the North American X-15, which has to be lifted into the air and launched from a "mother-plane".

The 188 is surprisingly conventional in shape, with two de Havilland Gyron Junior PS.50 turbojets (each giving 14,000 lb. thrust with reheat) mounted Meteor-fashion on its mid-set wings. But its structure and equipment will make use of the latest ideas for high-speed flying, and it will be built almost entirely of heat-resisting stainless steel. The wings will be very thin, with 38 deg. of sweepback immediately outboard of the engine nacelles and 64 deg. at the tips. Their span will be only 35 ft. 1 in., which is less than that of most Auster lightplanes, and the length of the fuselage will be 71 ft., excluding the nose probe. First flight will probably be late this year.

America Regains World Records

Determined not to let Russia capture all worthwhile aviation records, U.S. Air Force pilots have put up some remarkable performances in recent months. In doing so,

An impression, based on a photograph of a model, of the Bristol Type 188 stainless steel supersonic research aircraft described on this page.

they have given a good indication of the capabilities of America's latest fighter 'planes.

As a start, the United States has regained the world speed and height records. Flying a Convair F-106A Delta Dart from Edwards Air Force Base, California, in mid-December, Major Joseph W. Rogers averaged 1,525.95 m.p.h. in two runs over a straight course at an altitude of 40,550 ft. This raised the record held by a Russian E-66 fighter by about 43 m.p.h.

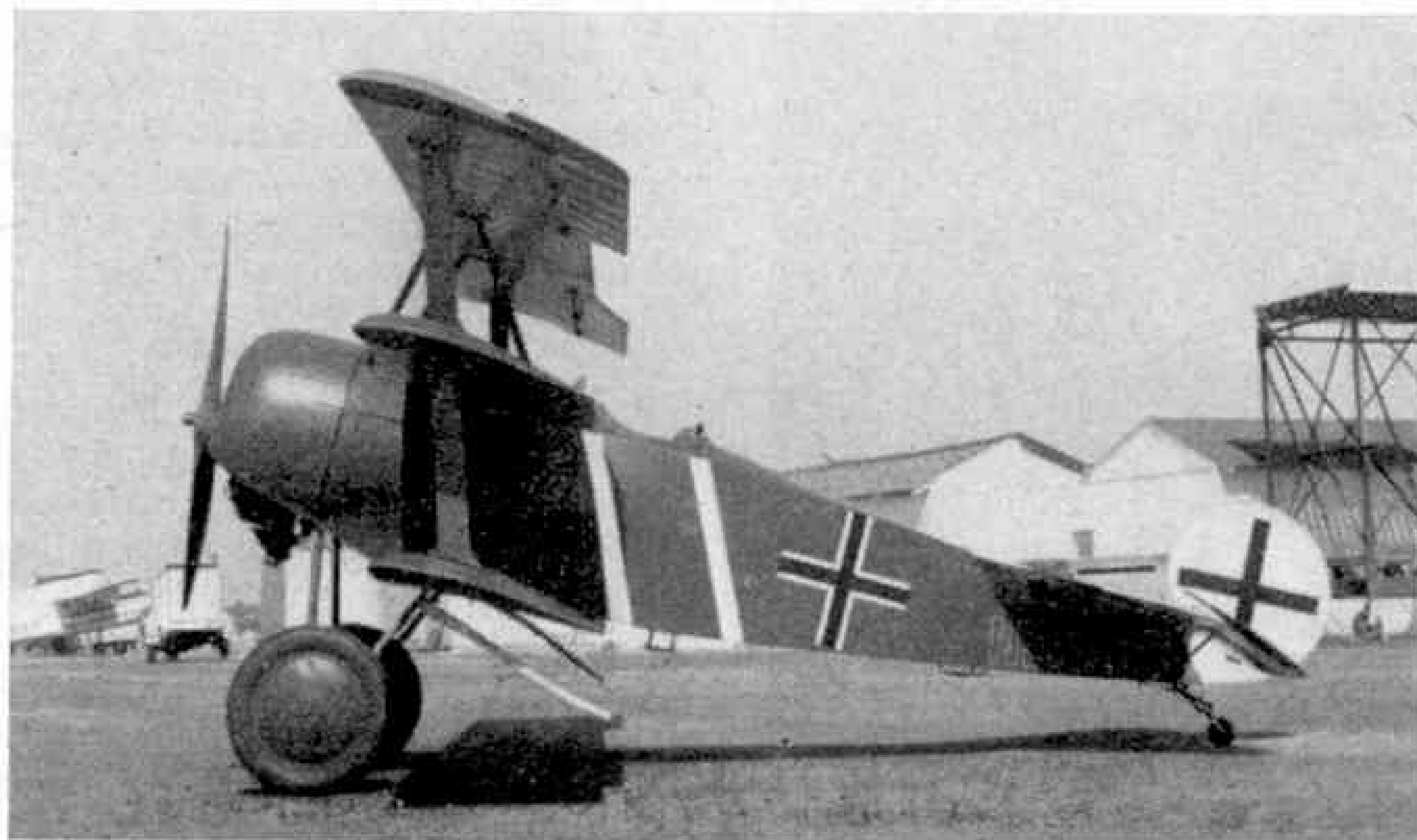
At about the same time, Captain Joe Jordan reached a height of 103,395.5 ft. (19½ miles) in a Lockheed F-104C Starfighter, beating earlier records of 94,635 ft. by a Russian T-431 and 98,560 ft. by a McDonnell F4H Phantom II of the U.S. Navy. An interesting point is that, for the first time in many years, the aeroplane height record now exceeds the best performance by a balloon.

An unofficial record was an average speed of 1,216 m.p.h. over a 100-km. circular course, by Brig.-Gen. Joseph H. Moore in one of the new Republic F-105 Thunderchief supersonic atom-bombers. He took just 183 sec. to cover the equivalent of 62 miles.

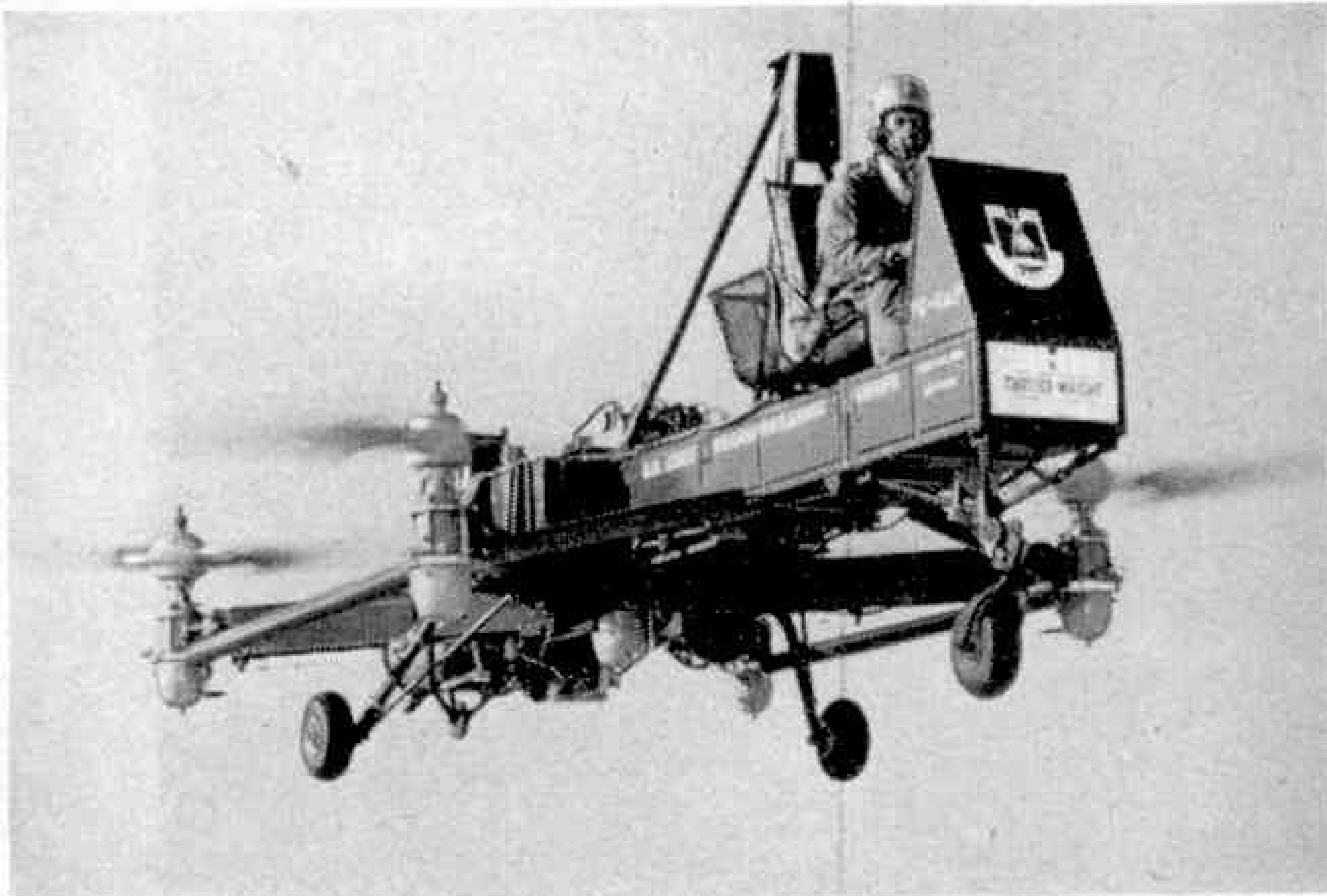
The Fokker Triplane of World War I

The aircraft shown in the lower illustration on this page looks as if it ought to have been in *Air News* in 1917 rather than in 1960. It is a Fokker Dr.1 Triplane, similar to that in which the German ace of aces, Baron Manfred von Richthofen, claimed many of his 80 victories over the Western Front in France. But a key to its real age is given by the modern U.S. civil registration behind the German crosses on its rear fuselage.

Although this Triplane is almost identical with the original version, it was completed only two years ago. It is one of a number of replicas of this famous fighter



An American-built replica of the Fokker Triplane fighter, a type famous in the first World War. Photograph by John W. Underwood, U.S.A.



Another U.S. Army "flying jeep", the Curtiss-Wright VZ-7AP Flying Platform.

'plane of the 1914-18 War that have been built and flown by amateurs in America, the main differences being the larger main wheels, steerable tailwheel and the 125 h.p. Warner radial engine which replaces the normal 110 h.p. Oberursel rotary engine.

Duke's Automatic Landings

Britain's revolutionary Autoland system, by which aircraft can be brought in to land automatically in bad weather, was tried out by H.R.H. Duke of Edinburgh at the Royal Aircraft Establishment, Bedford, on 5th December last. Sitting in the co-pilot's seat of a Canberra trainer, the Duke made three fully-automatic landings at between 110 and 120 m.p.h., without either the pilot or himself touching the controls.

The Duke also flew the Saunders-Roe SR-N1 Hovercraft for a short period when he was given a demonstration ride in it at Cowes on 18th December last.

Second Jeep Flying

Following successful tests with the Piasecki VZ-8P, which was described and illustrated in the June 1959 *M.M.*, a second U.S. Army "flying jeep" has now begun its trials. It is the Curtiss-Wright (formerly Aerophysics) VZ-7AP Flying Platform, a picture of which appears at the head of this page.

The VZ-7AP is powered by a 425 h.p. Turbomeca Artouste IIB shaft-turbine, which is geared to drive four two-blade rotors. The pilot has an open seat at the front and flies the aircraft by means of helicopter-type controls. These consist of a collective-pitch lever for climb and descent, a joystick which changes the pitch

of the rotors differentially for control in pitch and roll, and pedals to operate a rudder which works in the jet exhaust. Soldiers, supplies or weapons can be carried on a platform between the rotors.

Length of the VZ-7AP is 17 ft. and it is 16 ft. wide. Its normal weight at take-off is 1,700 lb., including a 555 lb. payload.

More Mergers

As expected, the number of companies in the aircraft industry is continuing to get smaller. Following the take-over of Folland Aircraft, Hawker Siddeley are adding the Blackburn and de Havilland companies to their huge group, which already includes Armstrong Whitworth, Avro, Gloster, Hawker and Avro Aircraft in Canada, plus a half-share in Bristol Siddeley Engines. The aircraft divisions of English Electric and

Vickers also plan to merge.

A similar process seems to have started in America, where Boeing are hoping to take over the Vertol helicopter company.

Jet Built from Spare Parts

Shown in the lower illustration on this page is the only privately-owned Lockheed T-33 Shooting Star in the world. It is also the only one without a factory serial number, because it was built from spare parts gathered from all over the world.

The owner of this unique two-seat jet "executive transport" is Mr. Robert V. Kamensky, of North Hollywood, California, and it was assembled by Porterfield Air Service at Phoenix, Arizona. The colour scheme is white and turquoise, with black trim.

Although this T-33 will fly at 600 m.p.h., it is not quite the fastest privately-owned aircraft, because at least one F-86F Sabre jet-fighter is flying in civil markings.

Ten Million Civil Turbine Hours

The finest possible proof of the quality of Rolls-Royce jet and turboprop engines is that they had completed ten million hours of flying in airline service by 18th December, 1959. This represents more than 85 per cent. of the flying done by all civil gas-turbine engines throughout the world (except Russia) up to that date, the other 15 per cent. being shared by four different engine manufacturers.

The ten million hours were logged by Dart turboprops in Viscounts, Fokker Friendships and Fairchild F-27s, and by Avon turbojets in Comet 4's and Caravelles, in service with a total of 58 airlines on six continents.

The only privately-owned Lockheed T-33 Shooting Star in the world. Photograph by Robert D. Archer, U.S.A.





My Visit to Kariba

By J. Wade

ONE of the largest dams in the world has been constructed in record time, and on one of the largest rivers. So said Sir Roy Welensky, Prime Minister of the Federation of Rhodesia and Nyasaland, as he tipped the last twelve-ton skip of concrete to finish the great dam wall, on 22nd June, 1959.

The work was not finished when I visited the site. The wall itself, while complete as a dam wall, is to carry a roadway linking the north and south banks of the Zambesi Gorge at a reasonable traffic level, and thus provide another crossing between the two Rhodesias. The power station, intended to utilise the dammed water, is far from complete, though power was expected to be delivered from it before the end of 1959. And later will come many projects for hotels, resorts, a new town and a fishing industry, all of which are still in the planning stage.

Those readers who have the June 1958 issue of *Meccano Magazine* will see from the illustrations there just how vast the project is, and those who can turn to the "From

Our Readers" feature, in the October 1958 issue, will be able to compare the illustrations with the picture published there. Only in July 1959 were the holes that allow the Zambesi to maintain its flow blasted out of the dam wall, so that the Portuguese and other users down river could enjoy the agreed 10,000 cusecs, or cubic feet per second, of water. Before this was done only about 750 cusecs were

flowing through a hole quite low in the dam wall. Such gigantic undertakings as the Kariba Dam are only made possible by skilful organisation and international

The mighty Kariba Dam, as seen from high up on the south side of Kariba Gorge. Behind it the waters of the Zambesi River have now formed an enormous lake. The illustrations to this article are from photographs by the author.

co-operation.

Work on the dam began about four years ago, and cement from Chilanga first arrived during 1955. This cement delivery really deserves a story of its own. Chilanga is near to Lusaka, capital of Northern Rhodesia, and a cement factory was established there in 1951, the only one in the Territory. When the dam was to be built a supply of first quality cement was a primary need, and Chilanga has supplied it. From the first 104 tons, in September

1955, grew the October total of 17,500 tons, and altogether over 300,000 tons of high grade cement have been delivered to the dam by special 24-ton road transports.

Chilanga is a little over 100 miles from Kariba, and for the last 40 miles a special "North Access Road" had to be built, by clearing a wide strip of "bush". This road contains four bridges and numerous culverts, and for most of its length is built up from 2 to 10 feet above the level of the forested valley over which it runs. For the last 8 miles or so it has to plunge into the hills that end in the north bank of the Zambesi Gorge, climbing, twisting and at the last plunging to its destination. It has successfully carried the huge transports that have been used.

Close to the dam, before the road plunges downwards, are the mechanical workshops, larger than a good-sized bus station, with a road to the right leading to cement tanks. Opposite are houses and a canteen for some of the Italian workers. Another quarter of a mile and a sudden bend introduces the deep drop to the Gorge, and one can see what appear to be Dinky Toys size trucks, bulldozers, Land-rovers and earth-shifters, crawling along the bottom and up the slopes of the south bank. A bit farther, and yet another bend, and then the dam wall comes into view.

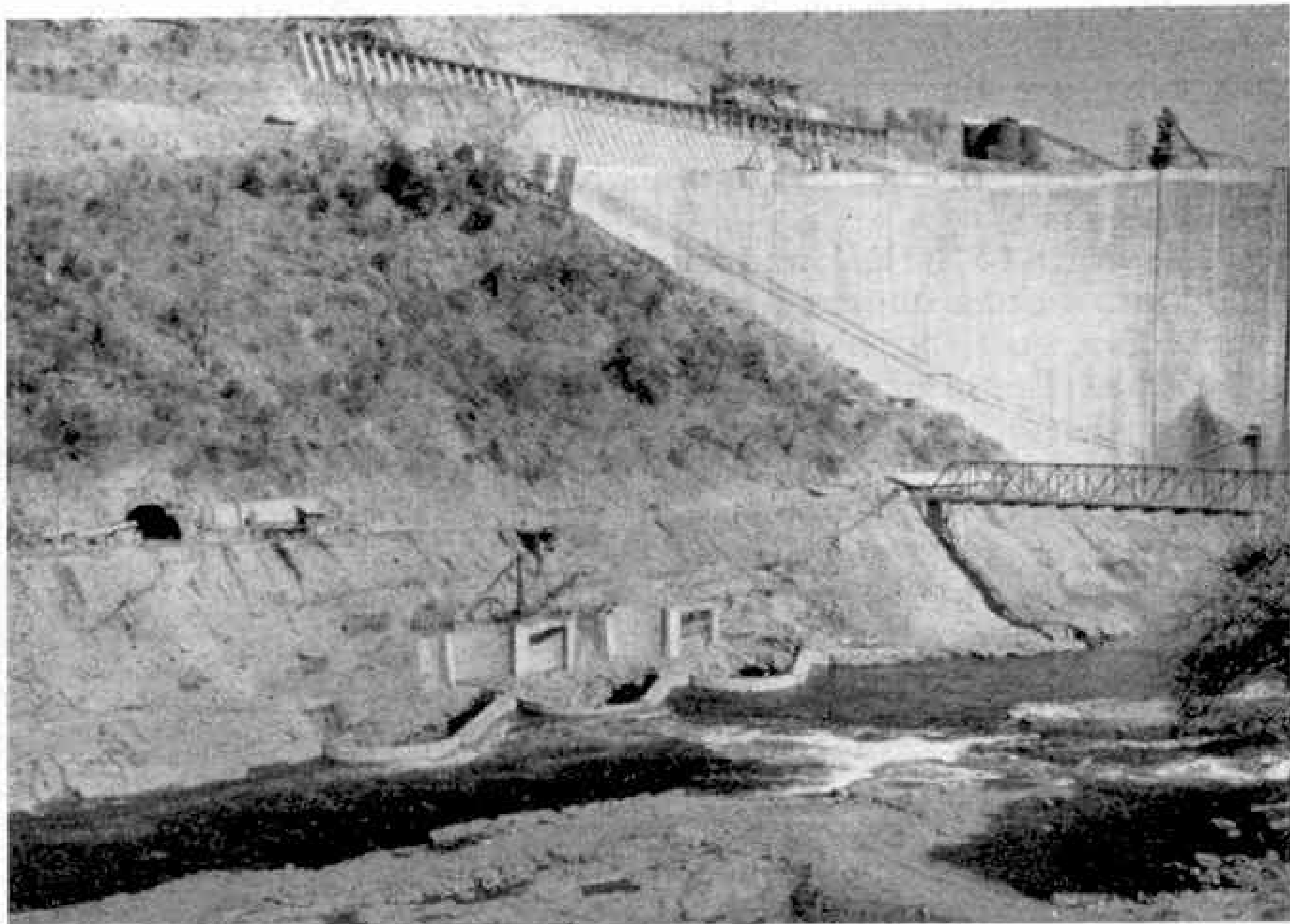
The first sight is disappointing. From here one is higher than the dam, and higher still are the steep sides of the Gorge. Man's work is dwarfed by Nature, and, surprisingly enough, a couple of million tons of concrete, nearly 400 feet high, are not so impressive at first sight. One has to look a while, get accustomed to the perspective, take in the tiny vehicles, the insect-like moving objects that are workmen, and watch a lorry go down and over the bridge before one comes to the only possible conclusion—that the Kariba dam matches its truly magnificent setting.

The dam and its surrounding hills, and the great lake formed behind the mighty

concrete wall, are destined to become one of the sights of the Continent. In the valley hundreds of feet below, the great Zambesi, reduced to its dry weather dimensions, and shorn of so much of its power by the dam, flows quietly along after its plunge through the wall.

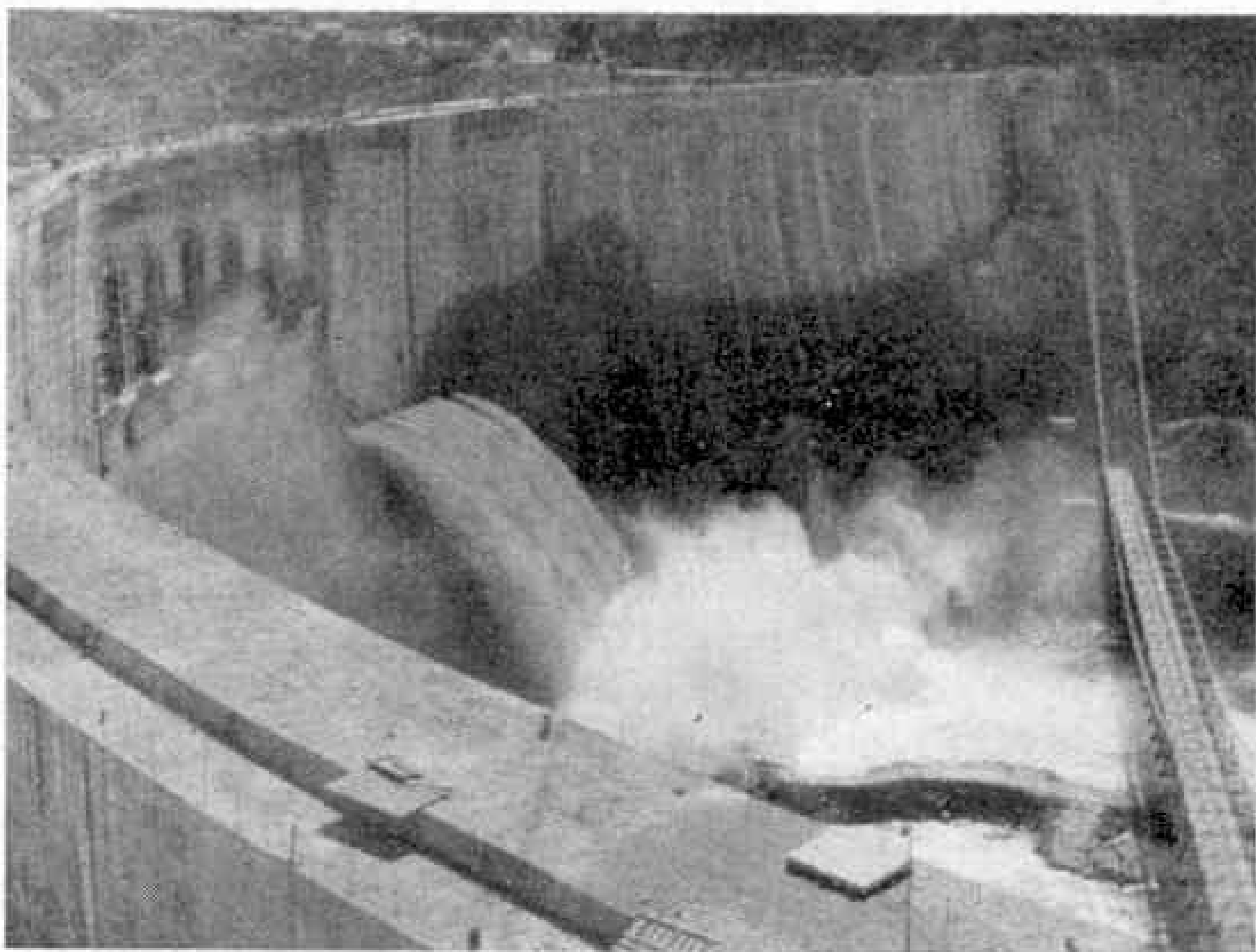
The road drops farther again down the steep gorge side to the temporary bridge built for use during constructional work, where "Stop and Go" signs regulate the traffic. Now there is a roar of foam as water hurls itself out of the low level overflow tunnels in the wall, to throw a spray almost as high. The bridge is under constant rain from the spray which, with the Sun, forms a perpetual rainbow. Looking up one can see, sickeningly high, the tiny men working on top of the wall and, down below, apparently bigger men like yellow ants in their oilskin coats.

On the other side of the Gorge, following the road in the welter of men, lorries, trucks, weird earth-shifters and flashing Land-rovers, one passes over the conduits that will take the spent water back to the river after ploughing through the turbines of the underground power station in its



This view of the south bank of Kariba Gorge shows, on the left, the entrance to the generating station, which is in a gigantic cavern hewn out of the rock. The outlets for water from the turbines are below.

rock cavern. Higher up the road is the entrance to the power station. Climbing still, up this south bank, past warning signs of falling rock from the towering cliff to the left, one passes, to the right, the overground work on the penstocks carrying water from the lake to the turbines,



A road is to be made on the dam wall, along which can be seen the spillway. Water is pouring out at the rate of 10,000 cubic feet a second from low level overflow tunnels.

The ends of the Blondin cables, the cableways used for conveying material to points required when building the dam, run to anchor in the hills as we pass beneath it. The lake side of the dam wall comes into view, and a part of the great lake itself. A little farther is the beginning of Kariba Township and, strung out along many hills, are tiny squares of white and pastel shades that are houses, standing out against the blue of the lake or the green of the hills.

A sharp turn to the left, and another steep little climb brings one to the South Bank Observation Post, next to the Chief Engineer's Office, which provides an uninterrupted view of the dam and workings. In front is the dam itself, a magnificent curve, with the perpetual foam of water pouring from it. The lake stretches away to the west for over 80 miles, and is 20 miles across at its widest point. From here only patches of it are visible, with some of the islands from which hundreds of game animals have had to be rescued. One island alone yielded twenty kudu, eighteen duiker, thirty-three impala, nine warthogs, nine

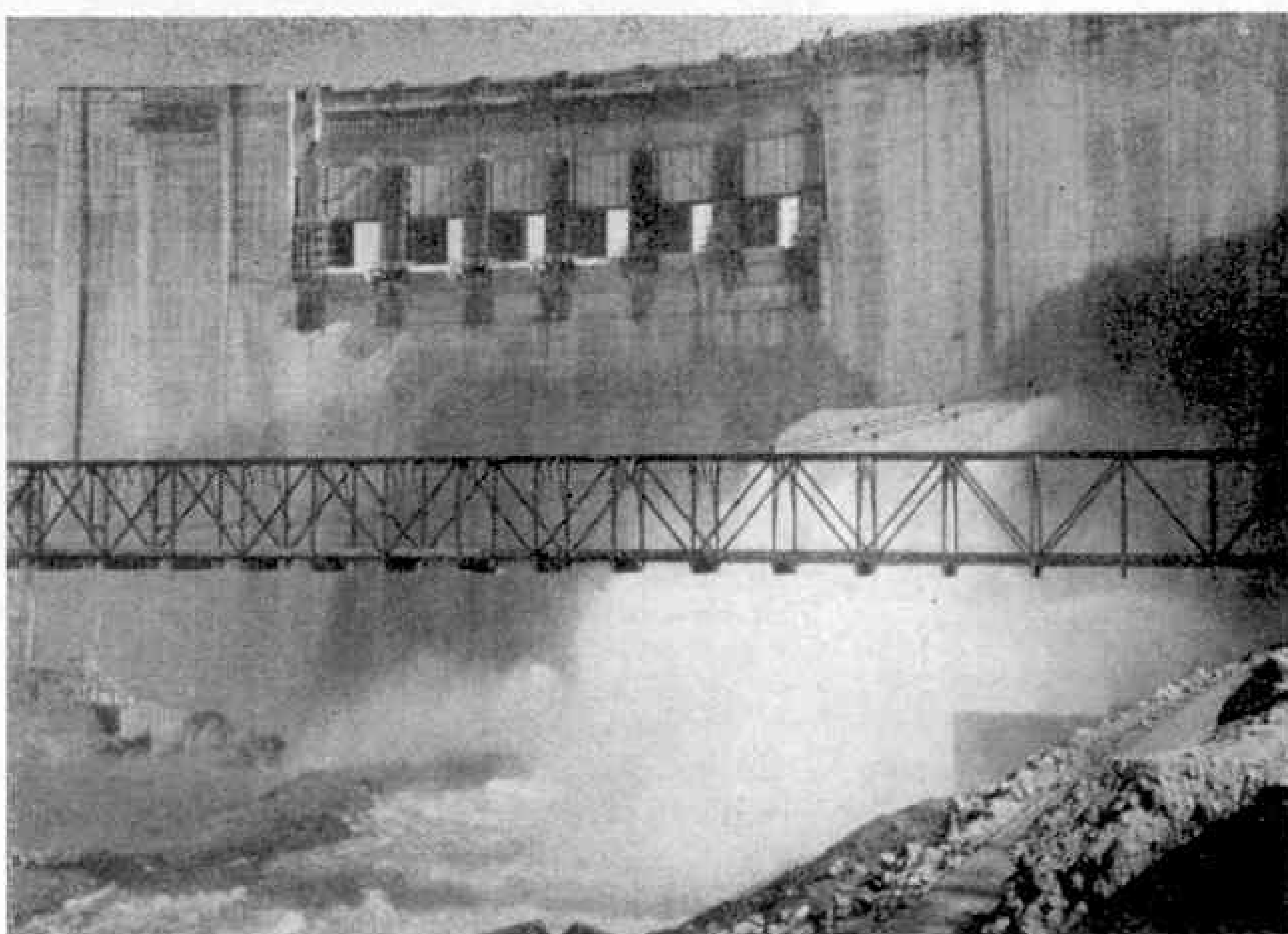
bushbuck, many smaller animals and a zebra.

To the east, in a truly great spectacle, the hills of the Zambesi Escarpment fade away in hazy blue, looking like crumpled velvet with their covering of trees. On the farther side, contouring the north bank of the Gorge, tiny weaving strips of road wind and twist and disappear over the horizon, with one of them clearly seen connecting with the north end of the dam wall.

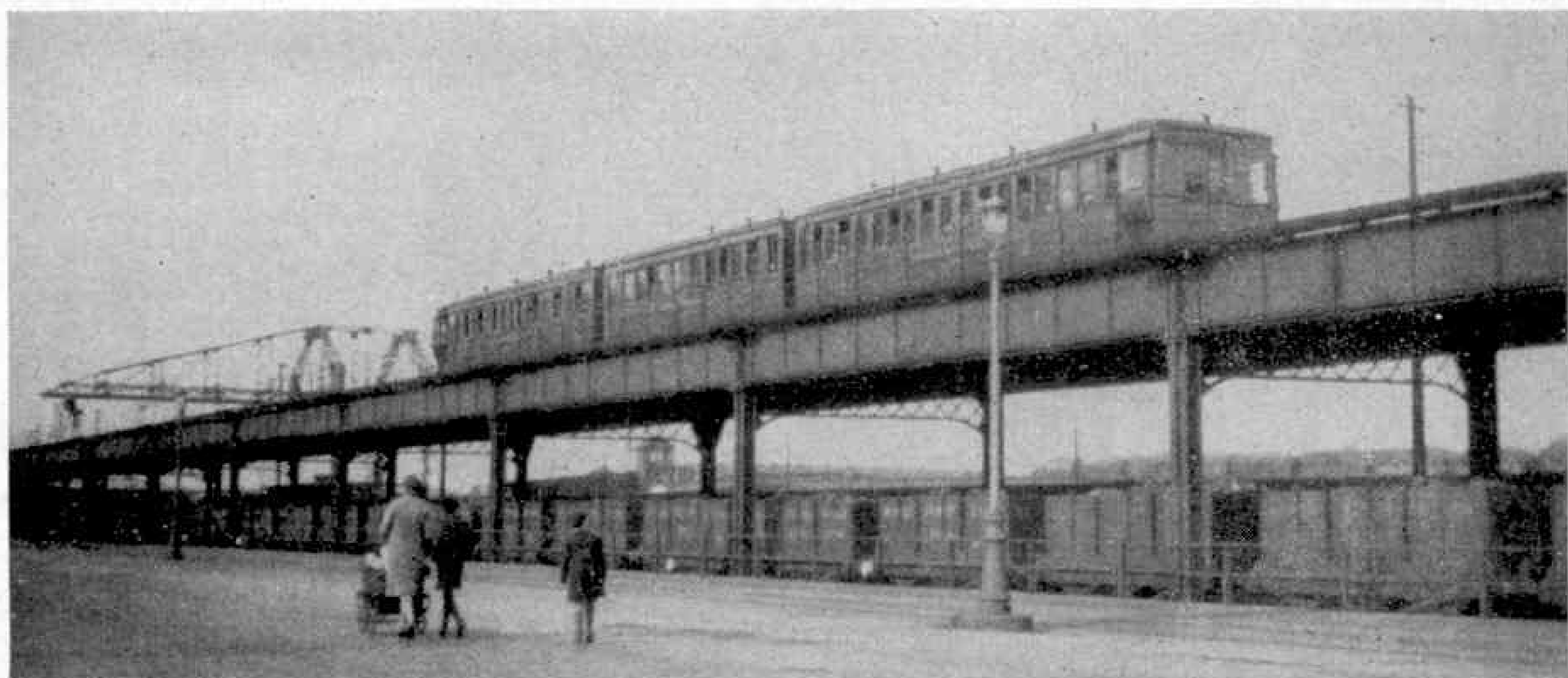
Spots of movement on the wall are workmen converting its surface to a roadway. Hundreds of Africans have been trained on the site to become skilled and capable workers, some underground, some on the wall, others driving large and complicated road machines. Over 30,000

rather primitive tribespeople have been moved from their homes alongside the river to make room for the dam, and a team of experts is engaged in making it possible for them to settle down and reshape their lives on the higher ground.

Kariba Dam has cost well over £20,000,000 and more than 60 lives. It presents an amalgam of courage, energy, skill, fortitude and confidence in the future of which any country could be proud. It was built ahead of schedule, despite the protests of the great Zambesi, which flooded and damaged the early work.



Another view of the dam, showing the spillway and the low level overflow. The spillway gates, to control the flow of water when the lake formed behind the dam is full, had not been fitted when the photograph was taken.



Liverpool's Overhead Railway

IF any public transport undertaking was ever a symbol of a city, it was the Liverpool Overhead Railway which was held in affection and esteem by the majority of the citizens and was known throughout the world. When the life of this unique railway was threatened, public concern was expressed through the medium of newspapers and public meetings, and when imminent death was announced, strenuous efforts were put in force to prevent any funeral; and even after its well attended expiry, further efforts were made to prevent the burial!

Alas, all this was of no avail, and on Sunday, 30th December 1956, the last trains departed from their terminals and made the final runs on a dark and cold winter night. Thus closed a long chapter in transport history.

The Liverpool Overhead Railway, which formed the subject of an article in the *M.M.* for November 1956, was unique in several respects. It was Britain's first and only elevated railway, one of the earliest electric railways, and the first railway in Britain to use automatic daylight colour light signals. It also attracted great attention in engineering circles right from the building of the first span. It enjoyed a life of over 60 years, and even now, when scarcely a trace of it remains, mere mention of it arouses happy memories for many from far afield as well as Merseysiders themselves.

The full story of this remarkable railway is told in a recently published book by Charles E. Box, who had many years of first-hand acquaintance with the railway. Its history, working, rolling stock and other associated subjects are dealt with in one

hundred and eighty-nine pages, profusely illustrated with reproductions of photographs, old and recent, with maps, drawings and diagrams. Its electric tramway "extension" is also dealt with, in detail, by Norman Forbes, B.A., who has a first-rate knowledge of it.

The frontispiece of the book is a reproduction of one of the colourful posters once displayed by the "Overhead", giving a panoramic glimpse of the railway and the Mersey, and advertising the popular "Round Trip", which for little more than one shilling provided an hour or more of interest and enjoyment. Mr. H. Maxwell Rostron, M.I.Mech.E., M.I.E.E., the last General Manager and Engineer of the line, has written the foreword.

As the Overhead Railway was inseparable from ships, which were in close view and in great variety along the greater part of the line, a chapter on shipping, written by Kenneth Longbottom, has been included. This forms one of the several appendices giving much useful information.

There must be many thousands of *M.M.* readers, past and present, who have travelled on the "Overhead" and to whom this history is recommended. It will arouse pleasant memories and perhaps the wish, shared by countless others, that they could once again ascend the stairways that led to the "electric cars", as they were originally known, of this once altogether unique railway, and enjoy one more fascinating run alongside the long and colourful succession of Liverpool's docks.

"*The Liverpool Overhead Railway 1893-1956*" by Charles E. Box. Copies can be obtained direct from Railway World Ltd., 245 Cricklewood Broadway, London N.W.2, price 25/-, postage extra.



The new order of things outside King's Cross, where a B.R. type 2 Sulzer-engined 1,160 h.p. diesel-electric locomotive is about to enter the terminus with a train of empty stock. Photograph by C. A. Gostling.

Railway Notes

By R. A. H. Weight

Aboard the "Mid-Day Scot"

I have enjoyed and reported several good northbound runs during recent years by this London-Glasgow express, through to Scotland or part way within the southern half of the journey, behind both classes of Stanier 4-6-2 steam locomotives. Last year's trip was markedly different, however, as the haulage unit was No. D226, one of the 2,000 h.p. type 4 diesel-electric series now becoming familiar. Another of these locomotives was illustrated last month after arrival with the *Tees-Tyne Pullman* at King's Cross, travelling the East Coast Anglo-Scottish route.

We were off from Euston down the one-time rival "West Coast" at 1.20 p.m., in a full but comfortable 12-coach train, tare weight 394 tons, or about 425 gross. I am not sure if there was any rear end assistance, such as is often provided at the start by the engine that has brought in the empty train, but we gathered speed rapidly up the initial sharp rise to Camden Shed. Indeed the passing time to Willesden Junction, $5\frac{1}{2}$ miles in barely 8 min., was the quickest I had experienced in an express.

The diesel continued to run excellently and regained a considerable amount of time, if it did not create any more records. There was a slowing for repair work on the rise to Tring, and another about 60 miles out at Roade. Between these, along the easy stretch between Tring and Wolverton, we averaged 78 m.p.h. with a maximum of 82.

As then timed the *Scot* was required to call at Rugby to take up passengers for the north only. We were there early, in $80\frac{1}{2}$ min. for $82\frac{1}{2}$ miles, so we had to wait almost 6 min. for the scheduled 2.46 p.m. departure. Rapid acceleration again over gentle gradients took us through Nuneaton at 75 m.p.h., $14\frac{1}{2}$ miles in $14\frac{1}{2}$ min. When passing Stafford, 51 miles from Rugby start had been reeled off in 45 min. and, including the lengthy stop plus two slowings, we had

averaged over 60 m.p.h. from Euston, 133 miles away.

Later came a short signal stop at Norton Bridge, a junction for Stoke-on-Trent, preceding a long slack where the track was being relaid, but then D226 soon accelerated uphill to 61 m.p.h., on the moderate rise to Whitmore, leading to top speeds of 77-78 down to the great marshalling yards and track networks that herald the approach to Crewe. There we alighted at 4.4 p.m., or 3 min. early, having covered 158 miles overall in 164 minutes. A semi-fast train that had been closely ahead after Stafford must have hustled along into Crewe to keep clear, while the Liverpool and Manchester portions of the *Pines Express* had evidently been well up to time and had gone off along their respective northward routes. Attaching two more well-filled

coaches making a long Plymouth-Glasgow journey by way of Bristol-Shrewsbury-Crewe, 4-6-2 *City of Manchester* took over a heavy train for the 243-mile run forward to Glasgow over Shap and Beattock summits, calling at Carlisle and Carstairs.

The present modified schedule provides for an early start from Euston at 1.5, one stop only at Carlisle and a 35-min. saving from London to Glasgow with a limited, lighter, load.

Locomotive Tidings

Additions to new stock have lately included 2-10-0s, class 9: Nos. 92213-5, allocated to 84C, Banbury depot, and 92216-7, to 86C, Cardiff, Canton. With diesel-electric propulsion, Peak class No. D9, *Snowdon*, for L.M.R. service, Nos. D239-50, to Gateshead, N.E.R., and type 4 express diesel-hydraulic Nos. D813-4, named respectively *Diadem* and *Dragon*, to W.R.

For the electrified main lines now in course of preparation southward from Liverpool, Manchester and Crewe, 23 3,300 h.p. Bo-Bo locomotives are on order. The first, E3001, was illustrated last month. They will operate on the 25,000 volts A.C. overhead traction system, having a maximum tractive effort of 48,000 lb. and capable of speeds up to 100 m.p.h. They have four traction motors and eight wheels 4 ft. diameter. They are drivable from either end and weigh about 80 tons. Two more for mixed traffic will have greater power, but will not be geared for such high speeds. No. E3001 is stationed at Longsight, Manchester. The first operating stage will be Manchester-Crewe.

In consequence of the introduction of a good many diesel main-line locomotives on the L.M.R. Western Division, Royal Scot 4-6-0s have been noted working from Preston, Llandudno Junction, Wolverhampton (Bushbury) and Nottingham (Midland) Sheds, with more at Kentish Town. Some Britannia Pacifics also have been noted from Crewe, North.

Well over 200 of the successful class 9 2-10-0s are in service. Construction of the final examples of this last B.R. steam design was nearing completion at the time of writing. Their duties over many routes include long runs with express freight services, while at times of holiday pressure in summer they have been used a good deal to haul additional fast passenger trains, attaining top speeds well over 80 m.p.h., on exceptional occasions although their driving wheels are only 5 ft. in diameter.

Last year it was on the Western Region that the majority of such instances were observed, including

trains destined for the former Midland West of England main line by way of Gloucester, for example. The accompanying photograph, however, depicts No. 92018 in the course of a long run on a holiday express at Derby, that focal point in the Midlands where many varieties of locomotive have been noted on busy days, including E.R. types.

All 16 S.R. Lord Nelson 4-6-0s are now stationed at Eastleigh. Locomotives of the class are often seen on boat trains between Waterloo and Southampton Docks.

Operating Problems at King's Cross

This famous London terminus is over 100 years old. The passenger station covers about 16 acres and has 17 platforms, including two through suburban ones on steeply graded lines also used for freight connecting with the Metropolitan line of London Transport. Many enlargements and improvements have taken place in course of time, but it is hoped to undertake considerable rebuilding before very long, with realignment of approach tracks. The uphill start for more than a mile is a difficult one through two tunnels, between which are rather hemmed-in connections to the locomotive depot and extensive goods station. There are only 4 passenger lines out to Holloway Yard, 1½ miles, where there was a station until 1915.

As there is unavoidably a good deal of crossing of paths by trains entering or leaving, careful regulation of trains with close headways are most important factors. Recent considerable employment of diesels on more loaded or empty passenger trains has aided in quicker clearance and acceleration. To save power and track occupation by empty carriage workings, some of the expresses remain at the platform after arrival from the north. There they are serviced and cleaned ready to restart again therefrom in an hour or two, with a fresh locomotive at the other end.

Heaviest Ever! Another London-Crewe Contrast!

On the opposite page I described my first diesel-hauled express trip down from Euston. Another 1959 journey thence to Crewe was doubly a pioneer occasion.

Going down when holiday and sportsfolk were off to Scotland in large numbers by the 7.5 *Royal Highlander*, bound for Perth, Inverness and surrounding mountainous areas, the 17-vehicle load consisted of 7 heavy sleeping cars, 6 modern corridor carriages and two big vans, with two restaurant cars on the front, for Crewe, that quickly filled for service of a good dinner. The tare weight without passengers, luggage, staff, etc., was 635



B.R. Standard class 9 2-10-0 Locomotive No. 92018 leaving Derby with a Paignton-Newcastle express. Photograph by P. J. Lynch.

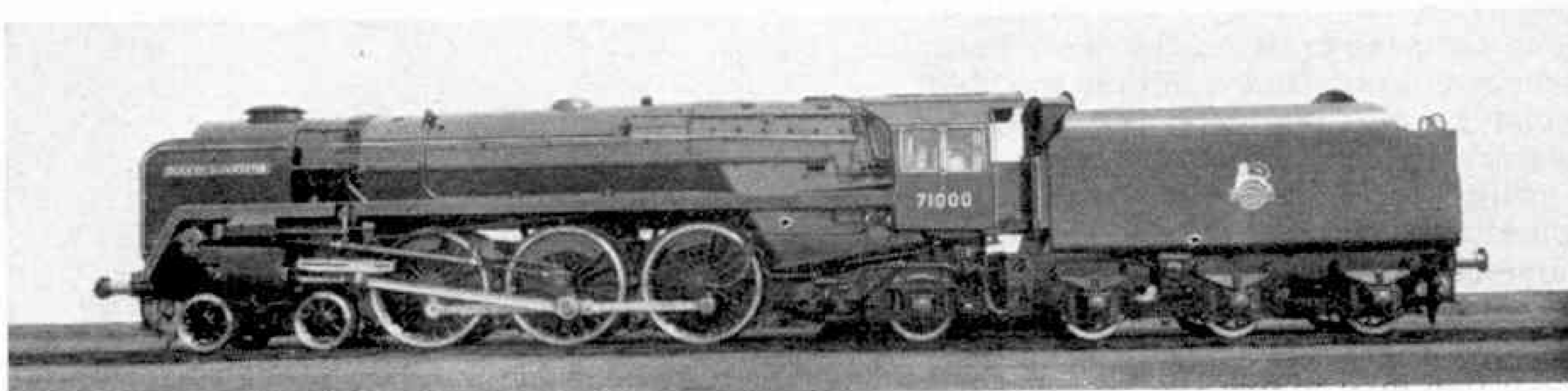
tons, decidedly the heaviest train in which I have travelled, though I had seen trains of similar weights, up to 20 coaches, on the King's Cross main line during wartime. The engine was some distance off the platform end and almost invisible, but I learned from the guard that it was the sole B.R. 8P 4-6-2 No. 71000 *Duke of Gloucester*, which has 3 cylinders and Caprotti valve gear, about to haul me for the first time!

Unfortunately the 2-6-4T banking from the platform dropped off sooner than expected, and our worthy steed all but stalled on the climb to Camden in damp atmosphere. After that she "got hold" of the huge train and plodded along steadily. It was a fairly generous non-stop schedule befitting an overnight express liable to load heavily, allowing for some extra slowings, and time would have been kept overall if the fates had not been unkind after Rugby. There we were almost stopped where trackwork was in progress and we were pulled up later by signal, making us a few minutes down at Crewe.

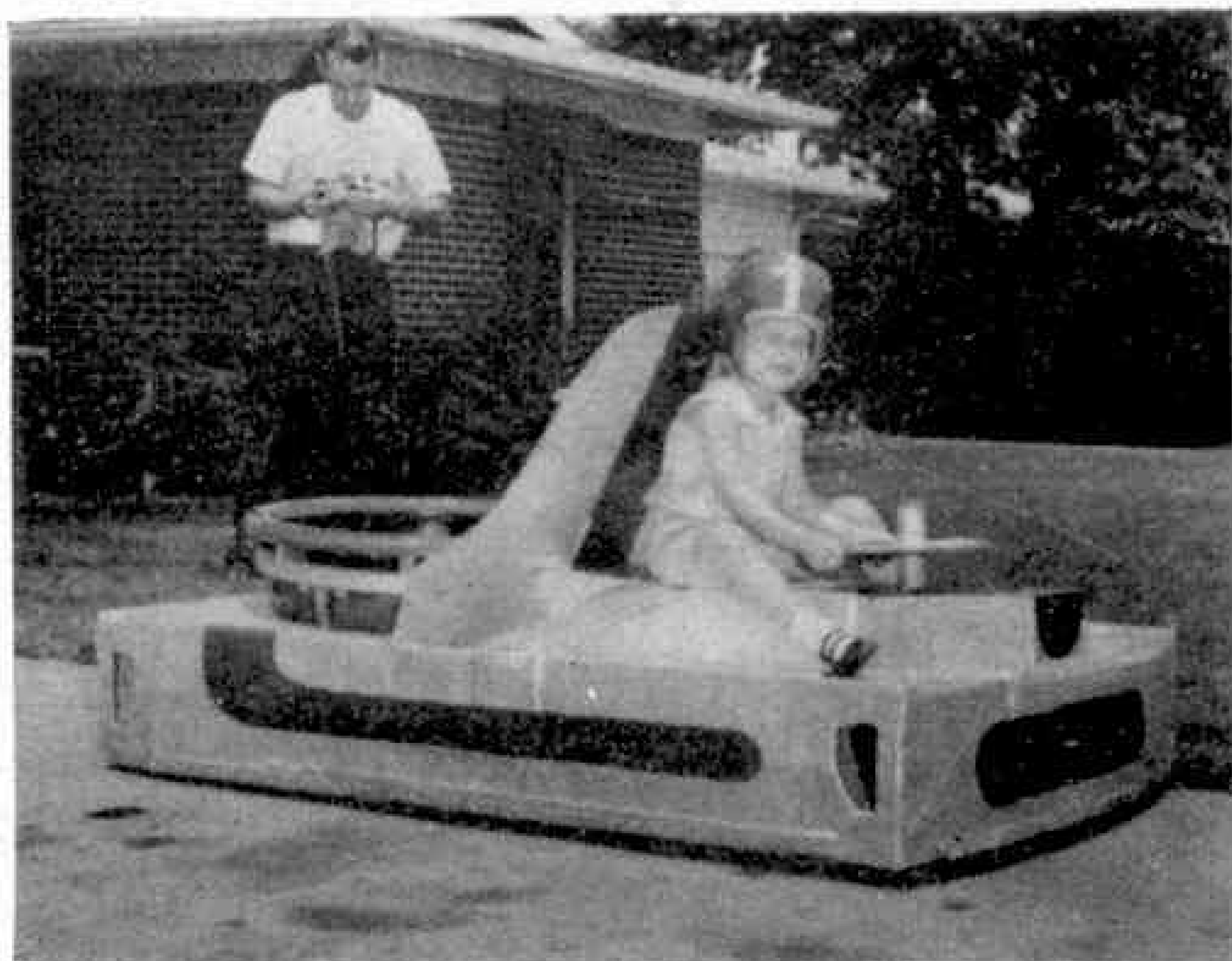
Duke of Gloucester, stationed and manned at Crewe, went off to the sidings with the dining cars and thence to the depot. I departed to the adjacent hotel after watching one of the "Princess Royal" Pacifics back on to the still lengthy train and take it away into the darkness. The next advertised stop was at Perth, at 4.44 a.m. next morning.

"The Anglo-Scottish Car-Carrier"

A new day-time train known as *The Anglo-Scottish Car-Carrier* providing a luxury restaurant car service for motorists with their cars travelling between London and Newcastle, and between London and Edinburgh, will run on weekdays from 30th May to 1st October. Departure times have been arranged to avoid rush hour congestion in Central London.



Class 8 4-6-2 No. 71000 "Duke of Gloucester", the prototype express engine of B.R. Standard design. This three-cylinder locomotive was built at Crewe in 1954 and remains the only member of its class. B.R. (London Midland Region) Official Photograph.



Fonda Wernicke in the "Kiddie Cushion" hovercraft built by her father and uncle. Photograph by Howard Levy, U.S.A. See also picture on page 160.

Hovercraft— A New Kind of Transport

By John W. R. Taylor

HOW would you like to have your own personal hovercraft? Not a big one like the Saunders-Roe SR-N1, but a single-seater, five feet long and with a speed of about 5 m.p.h., in which you could cruise around your back garden at home. It may sound as likely as having a private Comet jet-liner or double-decker 'bus; but a 4-yr.-old American girl named Fonda Wernicke does, in fact, have a hovercraft of this kind, and drives it around as easily as any pedal-car.

Fonda's father and uncle, who work for Bell Helicopter Corporation, built the vehicle, which they call the *Kiddie Cushion*. The body is made of cardboard, held together by a kind of sellotape, and cost less than £1. But the ducted fan (a 22-in. diam. two-blade propeller in a ring-shaped cowling), which provides the cushion of air underneath the hovercraft, is borrowed from Bell and is worth over £1,000.

The reason Fonda has it is that, all the time she is riding around, delicate instruments attached to the ducted fan are taking readings which will help Bell engineers to design bigger man-carrying craft on the same lines. So she not only has a unique toy, but must be the youngest test pilot in history.

This brings us to the question of whether one pilots or drives a hovercraft. Technically it is an aircraft, because it travels through the air; but Fonda never gets more than one inch above the ground, and even the big Saunders-Roe SR-N1 travelled down the runway at

Farnborough, during the last S.B.A.C. Display, with only 8½ in. of clearance beneath its flat underside. Consequently, it is best to think of these vehicles as being not aircraft, cars or boats, but something quite new which combines features of all three earlier types of transport.

First of all, then, how does a hovercraft work, and how does it differ from "flying jeeps" like the Curtiss-Wright VZ-7AP, illustrated on page 121. Taking the second part of the question first, the answer is that basically there is no difference.

Hovercraft and "flying jeeps" both make use of what is known as the ground-cushion effect. This means that they have a ducted fan or some other device which throws down a column of air, exactly as does a

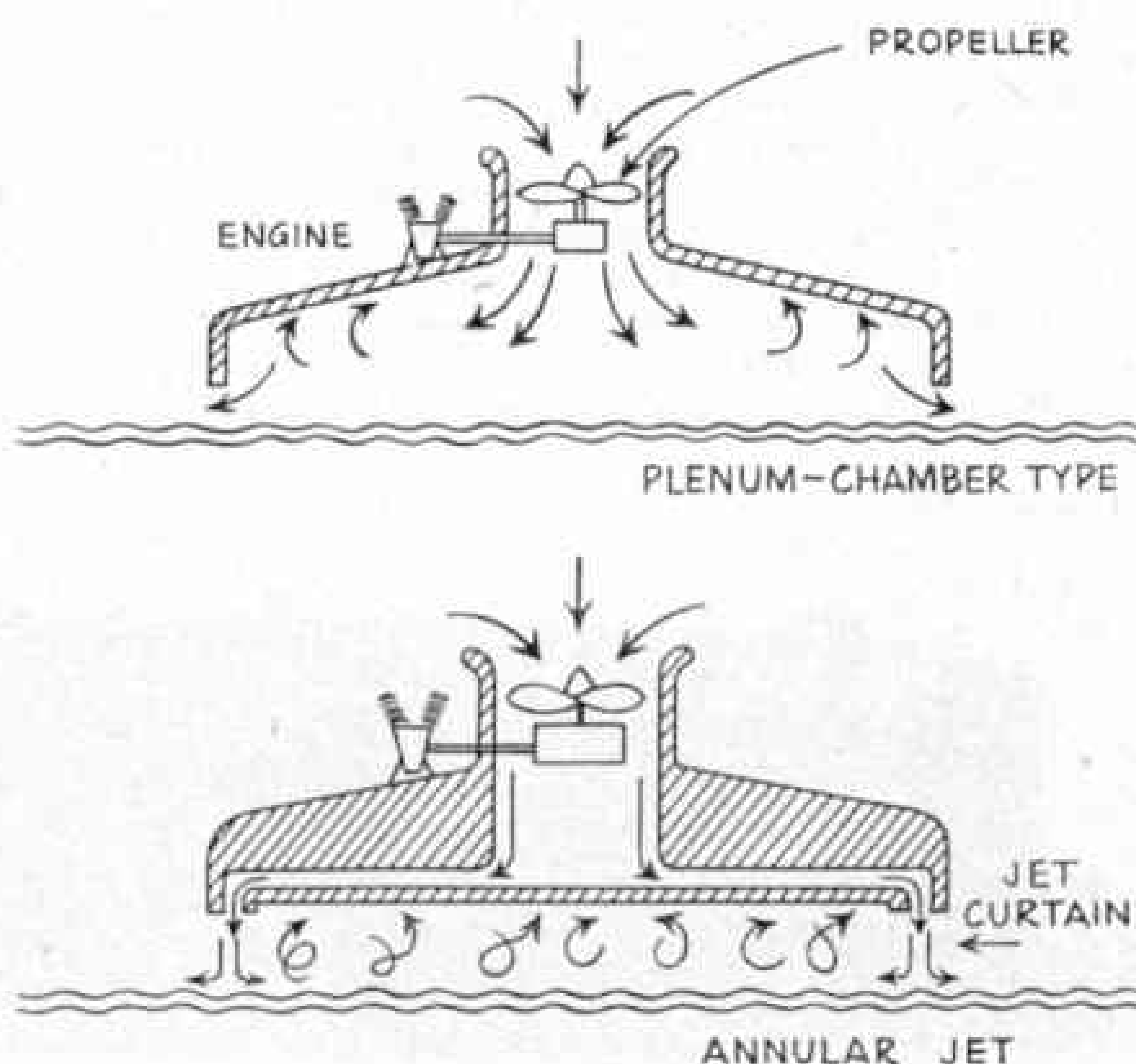


Diagram illustrating the principles of the two basic kinds of hovercraft.



helicopter rotor at take-off. This raises the pressure of the air immediately under the vehicle, and it simply rides along on this air cushion. Provided it stays near the ground it needs only a fraction of the engine power required by a helicopter to lift itself. This is fine for a hovercraft, but a "flying jeep" must be capable of climbing higher, to cross rough country or hedges, so it needs far more power than a hovercraft and is more like a helicopter.

There are two basic kinds of hovercraft, and the differences are shown diagrammatically in the lower illustration on the previous page. The simpler type makes use of the "plenum chamber" or "air leakage" principle, and is rather like a saucepan lid with a ducted fan in the centre. The fan builds up the air cushion under the lid to lift it off the ground and then has to keep up the pressure, supplying new air quicker than it can leak out through the gap between the rim of the vehicle and the ground.

Second kind of hovercraft is the "annular jet" or "air curtain" type, of which the SR-N1 is an example. This has a flat bottom plate under the "lid", so that air from the fan is ejected only through a narrow slot between the rims of the lid and flat plate. The effect of this air curtain is to prevent the cushion of air under the vehicle from leaking out. So, although it is more complicated than the "air leakage" type, it requires less power and should be cheaper to run.

A small hovercraft can be controlled and made to move in the required direction by tilting it—either by the pilot leaning over or by the use of compressed air jets—so

that more air leaks out on one side than on the other. Tilting the nose down, for example, would make it move forward, just as a helicopter moves forward when its rotor is tilted down at the front. Alternatively, flaps or vanes can be fitted to deflect some of the air in the required direction, without tilting the vehicle. Or, on larger aircraft, separate engines can be used to propel the craft forward by means of propellers or jet propulsion.

In the Saunders-Roe Hovercraft, which is a medium-size vehicle, some of the air from the ducted fan is diverted into large ducts at the sides and can be ejected from the front or rear of these, port or starboard, to steer and propel the craft. In time, however, a small jet-engine may be fitted at the rear for

propulsion. This would enable more air to be used to provide the air curtains, and the craft would be able to ride a little higher above the surface of the ground or water.

One thing we must remember is that all the hovercraft built so far are experimental. Most have been produced as cheaply as possible, merely to prove that their particular form of lift and propulsion system is practicable, and any hovercraft that are put into normal daily service in future will probably look very different from these prototypes.

Some newspapers have given the impression that hovercraft will take the place of almost all cars, railway trains and boats. Perhaps they will one day, but for the time being at least they are not intended to do so. The first one to be put on sale to the public is the Curtiss-Wright Air-Car, an early four-passenger version of which is

The picture above shows Britain's first hovercraft, the SR-N1, built by Saunders-Roe Ltd. for the National Research Development Corporation.

shown in the bottom illustration on this page. This vehicle, powered by a 300 h.p. engine, has a top speed of 60 m.p.h.; but it is not being sold for operation on normal roads.

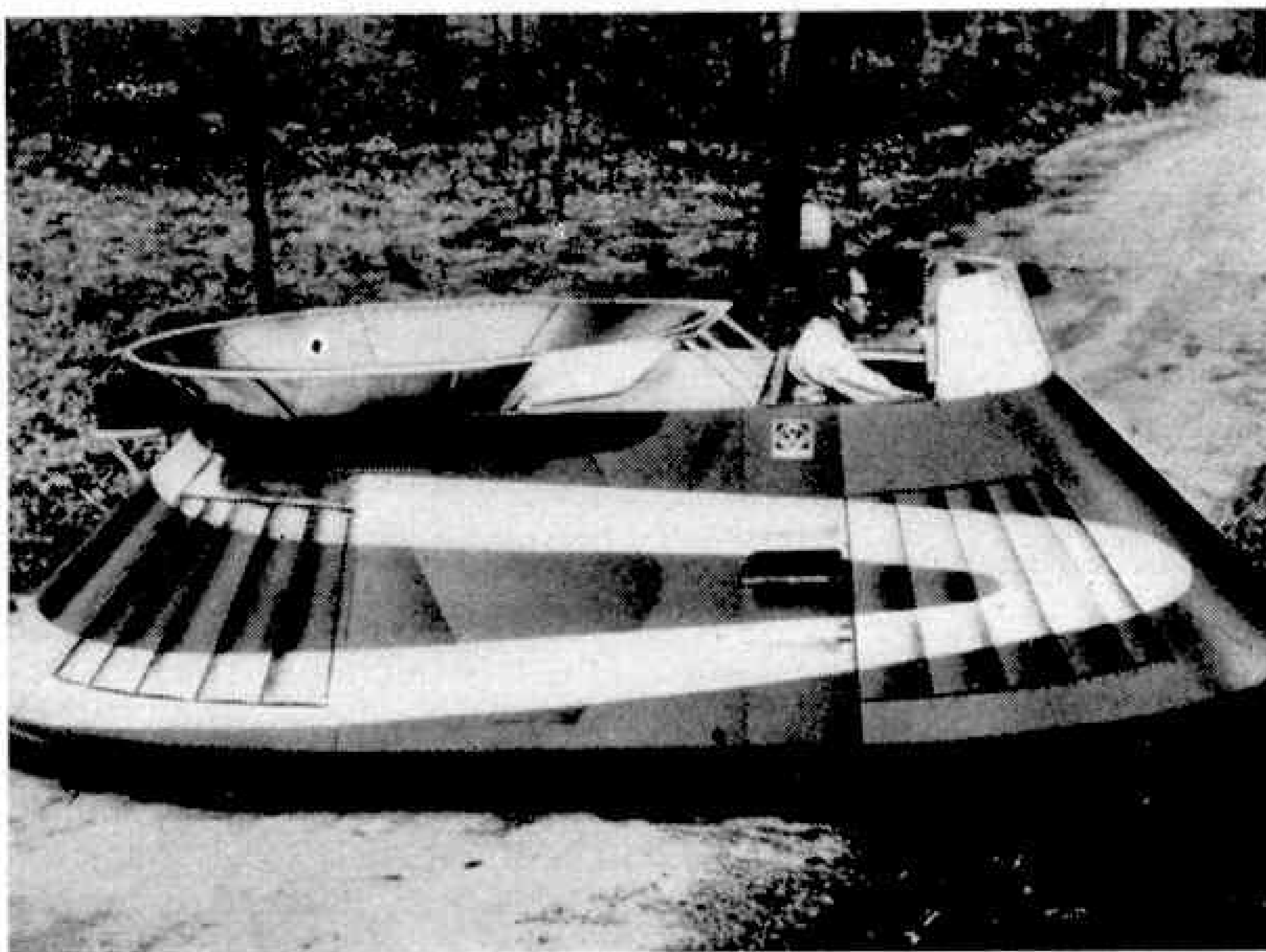
Curtiss-Wright believe it will find its greatest use in undeveloped areas, or as a passenger and freight transport on huge ranches, where it would be too costly to build proper roads, but where roughly-cleared tracks could be made fairly cheaply.

A hovercraft would, for example, be ideal for transport work in a jungle area where there was a river that it could fly along. It would be faster than a boat and less expensive to run, easier to drive and more versatile than an aeroplane or helicopter. Short tracks could be cleared ashore to carry it around waterfalls or rapids.

The Saunders-Roe Hovercraft has demonstrated well the capabilities of this type of vehicle, with flights over land and across the Channel. At Farnborough it carried 20 fully-equipped soldiers in addition to its pilot, on the power of a 435 h.p. Alvis Leonides piston-engine. A helicopter with this engine can lift only five people.

What is more, like most vehicles, the hovercraft gets more efficient and economical as it grows in size. The four-ton SR-N1 flies only 8-13 in. above the surface and therefore can be operated only over fairly smooth ground or quiet seas. A 100-ton cross-Channel passenger ferry hovercraft on the same lines, with a length of 130 ft., could carry 300 passengers and their baggage at a cruising speed of

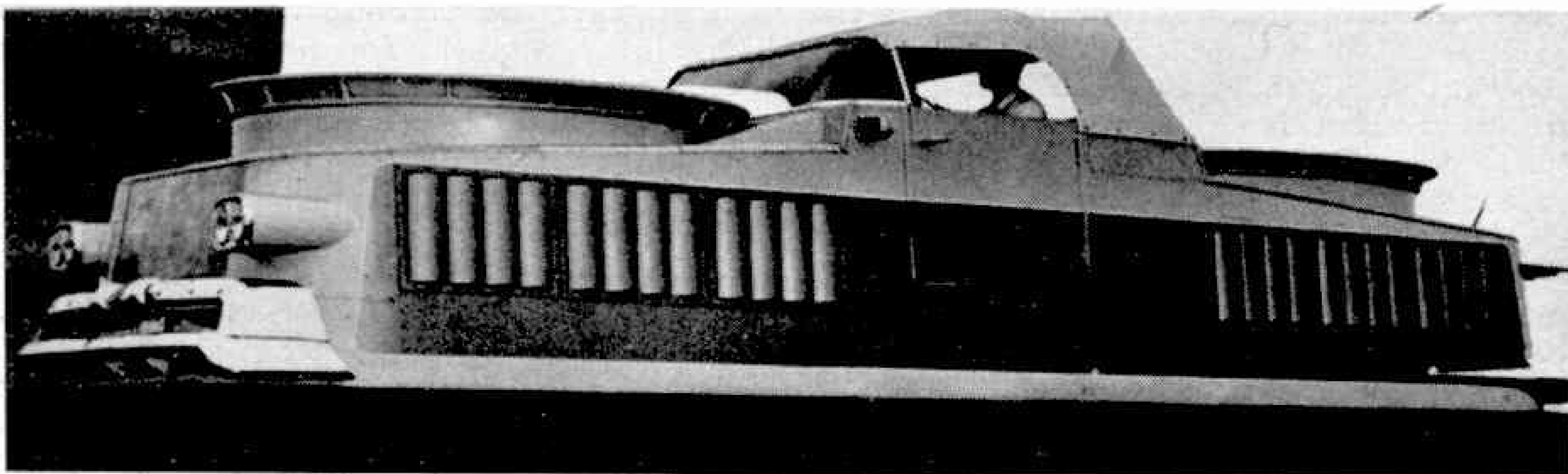
100 m.p.h., travelling up to 4 ft. above the surface. Surprisingly, this would be adequate for travelling over ocean waves, because waves of great height are also very



This small Air-Car, developed by the Curtiss-Wright Corporation, U.S.A., has a 200 h.p. piston-engine and can travel up to 12 in. above land or water.

long and can be surmounted with a hover height that is small compared with the wave height.

Because of this, a 400-ton model, cruising at 115 m.p.h., 3-8 ft. above the surface, could carry 160 tons of payload for a distance of 350 miles and unload on any beach or slipway, without the need for harbours or jetties. Nor is that all, for designers are already thinking in terms of saucer-shaped hovercraft of immense size, which would be able to carry hundreds of cars or thousands of passengers across the widest oceans at speeds comparable with those of present-day aircraft. If all this sounds a little far-fetched, remember that the hovercraft is only one or two years old.



A larger version of the Curtiss-Wright Air-Car. It seats four passengers and is designed to travel above the surface of land or water at 60 m.p.h.

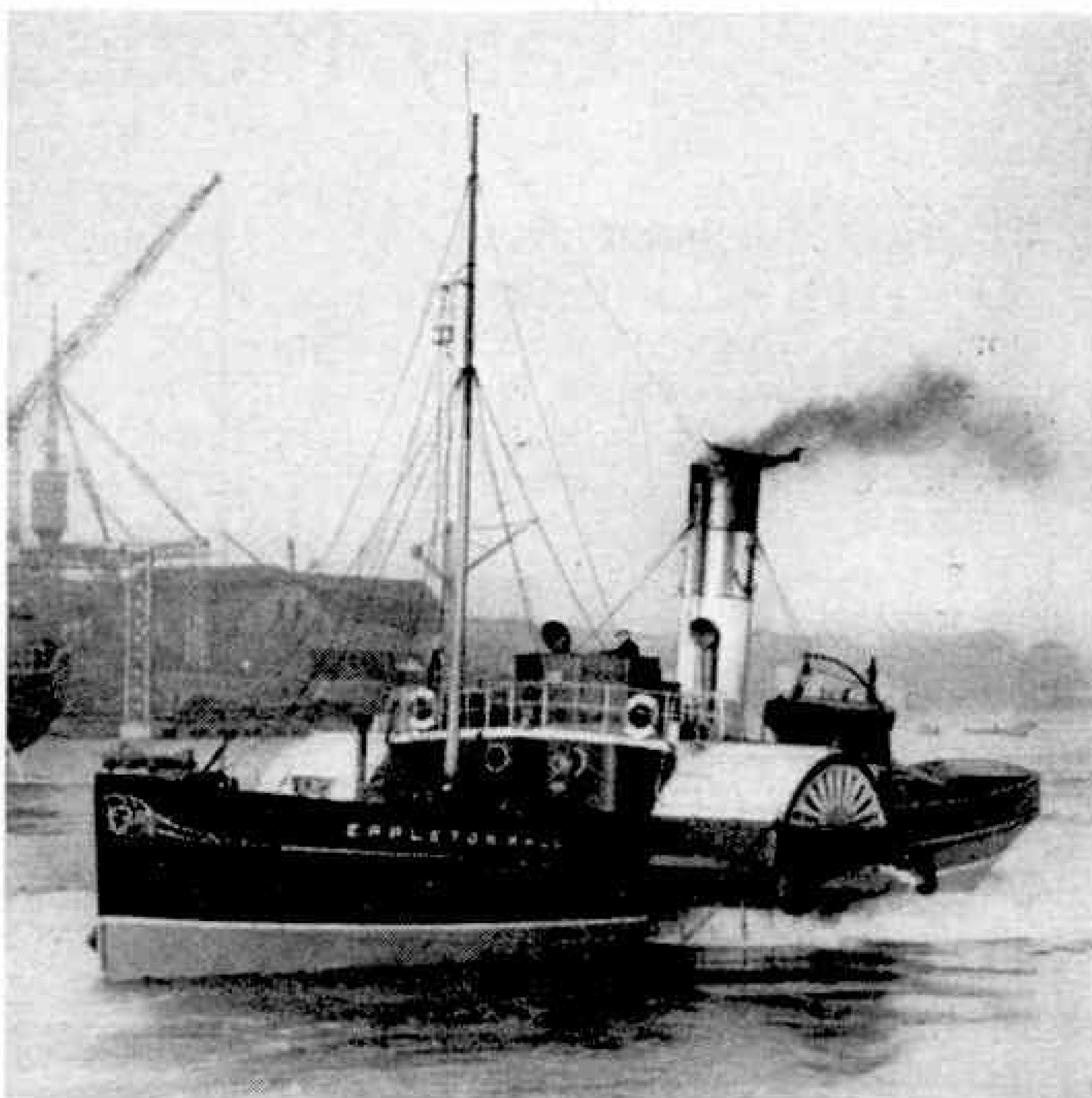
MECCANO MAGAZINE

Junior Section

A Paddle Tug Still at Work

The once numerous and universal paddle tugs on the River Wear at Sunderland, are now a disappearing feature, for only three remain. Twin screw diesel tugs now undertake all the principal towing duties.

Eppleton Hall, seen in the accompanying picture, is the youngest of the three, having been built and engined in 1914 by Hepple and Co. Ltd., South Shields, a firm that is no longer in



The notice does not seem to point a way to the Canada we all think of first when the name is mentioned, although there may be footpaths in the United States that may claim such a high-sounding destination. This Canada is a village near Weston-Super-Mare, Somerset. Photograph by Reece Winstone.

business. A short time ago, S. E. Teasdale, who took the photograph, went down to the Corporation Quay at Sunderland to see her, and has sent some particulars of this 166-ton vessel. She is 105 ft. long, 21 ft. 1 in. broad and 7 ft. 4½ in. in depth. Her paddle wheels are driven by two engines, steam for which is supplied by two boilers each with twin grates and designed for a boiler pressure of 45 lb. per sq. in., but now working on 35.

When first built, the paddle tugs were splendid vessels operating on picked coal. Today they have to use much poorer coal, and are outmoded, being employed only for steering at the rear of vessels and for towing barges. *Eppleton Hall* has the distinction of being registered for the carriage of passengers, and each August she is used by the River Wear Commissioners for carrying out their annual inspection survey of the River Wear. The tug is able to navigate 8 miles up the river as far as Barmston where a footbridge necessitates transfer to a launch for further progress upstream.

Her owners, William France Fenwick and Co. Ltd., readily gave information in this article.

"Spanner's" Special Section for Juniors

Easy Model-Building

Sports Car

In Fig. 1 is seen a simple little model of a Sports Car, that is specially designed for those who own only an Outfit No. 0. To build this simple model first take two Trunnions and bolt them to two $5\frac{1}{2}$ " Strips 2. One of the Trunnions is marked 1 in the illustration.

The Trunnions form the front and back of the driver's cockpit. Next join two $5\frac{1}{2}$ " Strips 3 to the Strips 2 by Angle Brackets held by bolts 4 on each side. Use those bolts also to fix in position Fishplates to carry the front axle. The axle is a $3\frac{1}{2}$ " Rod, and the wheels are 1" Pulleys fitted with Motor Tyres. Use Spring Clips to hold the Rod in position. For the rear axle use a 2" Rod, and a Bush Wheel for the single wheel. Pass the Rod through Angle Brackets bolted to the Strips 2 and hold it in place with Spring Clips. Place the Bush Wheel between the Strips 2.

To finish the rear end of the car, bend a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip slightly as shown and bolt it to the Trunnion 1. The top of the bonnet also is made with a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip, at the front end of which is a Flat Trunnion. Fix this Double Angle Strip to the second Trunnion bolted to the Strips 2.

Bolt a $2\frac{1}{2}"$ Stepped Curved Strip 5 to each of the Strips 3, and attach a $2\frac{1}{2}"$ Strip to each Curved Strip to form the sides of the bonnet.

A list of the parts required to build the Sports Car is given at the end of this article.

A Mechanical Sawing Machine

The construction of the Mechanical Sawing Machine shown in Figs. 2 and 3 is started by bolting two $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strips 1 and 2 to a $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate that forms the base. Also bolt to the base a Magic Motor in the position indicated.

To the upper lugs of the Double Angle Strips attach a $5\frac{1}{2}"$ Strip and a Fishplate 3, and to the free holes of the two Fishplates bolt a second $5\frac{1}{2}"$ Strip 4.

Now take another $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip and bolt to each lug a $1\frac{1}{2}"$ Strip.

This forms the saw frame, and the saw blade is represented by a further $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip 5, which is bolted to the lower ends of the $1\frac{1}{2}"$ Strips. A $\frac{1}{2}"$ Reversed Angle Bracket 6 is bolted to one end of the saw blade.

The saw frame moves to and fro on a guide consisting of a 5" Rod 7 held in a Double Bracket 8 pivoted on a Bolt lock-nutted to the $1\frac{1}{2}"$ Strip 9. The Strip 9 is bolted to an Angle Bracket fixed to $5\frac{1}{2}"$ Strip 4.

The saw frame is caused to oscillate to and fro by a Crank consisting of a Bush Wheel 10 fixed on a 2" Rod that rotates in two Angle Brackets fixed to the $5\frac{1}{2}"$ Strips forming the bed of the machine.

The Bush Wheel is linked to the saw frame by means of a $2\frac{1}{2}"$ Strip 11. The Strip is free to move on a bolt that is lock-nutted in a hole of the Bush Wheel, and the other end of the Strip pivots on another bolt that is passed through the Reversed Angle Bracket 6 and fitted with two nuts. The Strip must be quite free to move on the bolts at both ends. The 2" Rod carries a

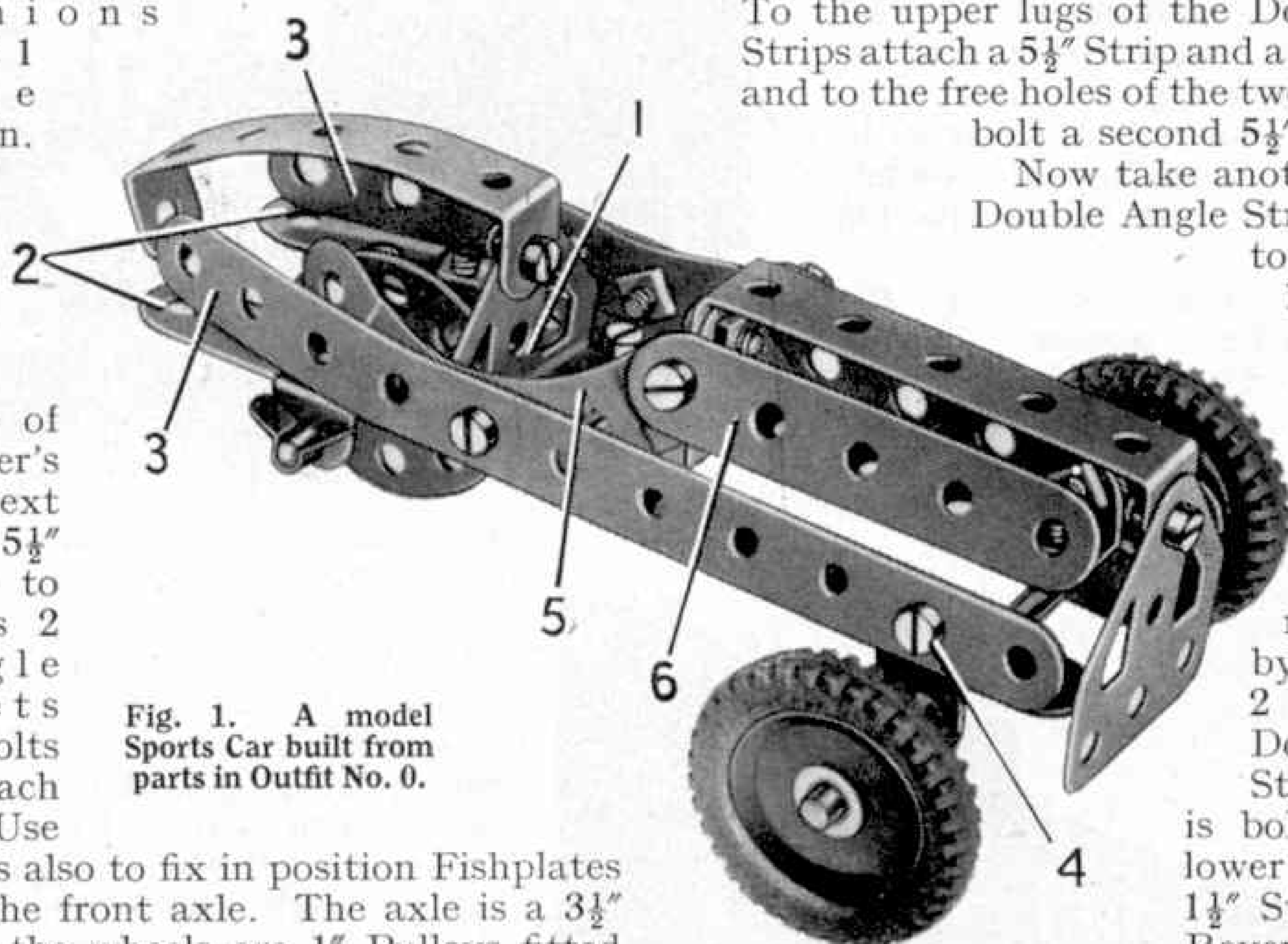


Fig. 1. A model Sports Car built from parts in Outfit No. 0.

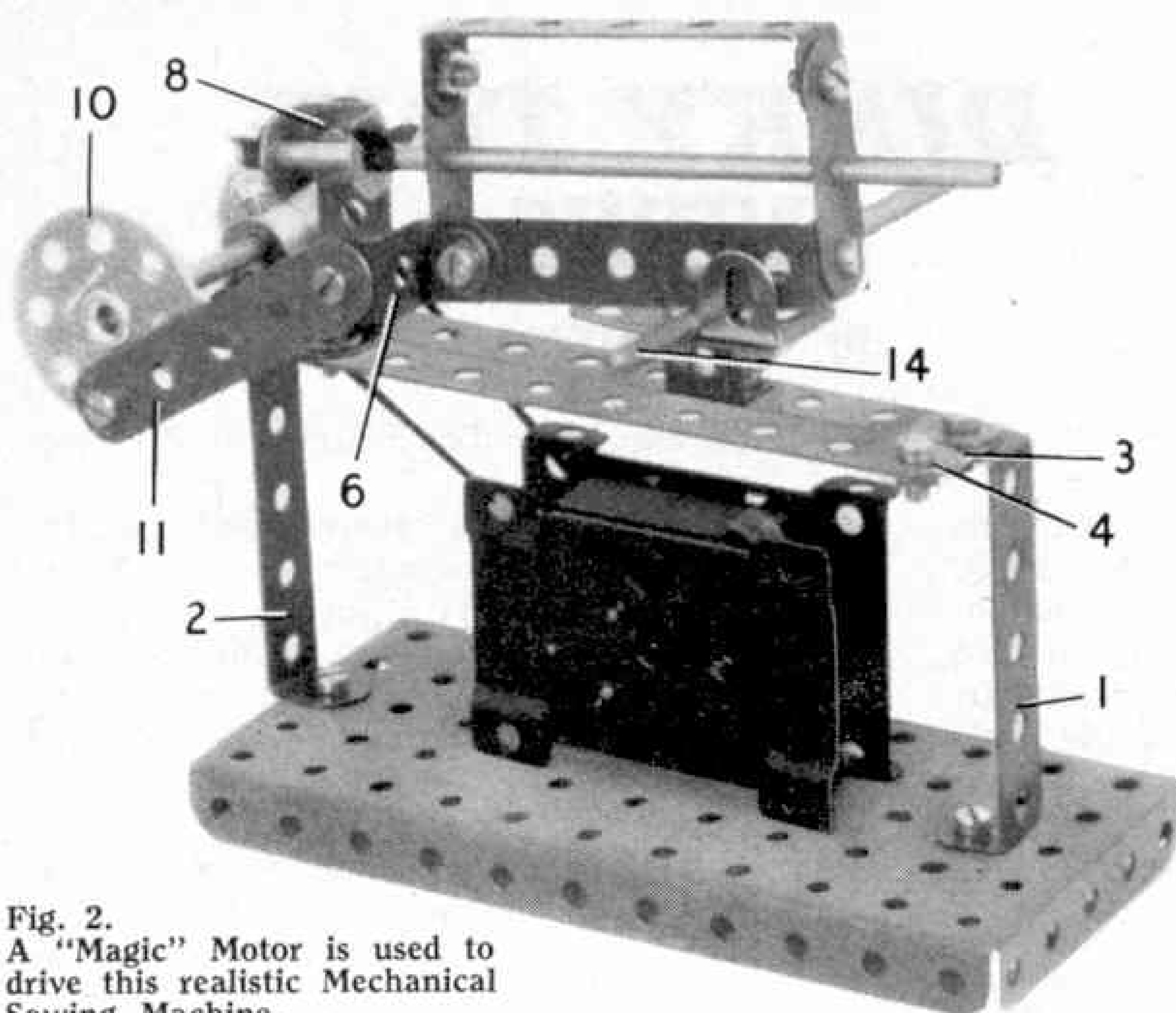


Fig. 2.
A "Magic" Motor is used to drive this realistic Mechanical Sawing Machine.

1" Pulley 12 that is connected by a Driving Band or belt of Cord to the pulley of the *Magic* Motor.

The work table consists of a Flat Trunnion bolted to a $\frac{1}{2}$ " Reversed Angle Bracket 13. The metal to be sawn, which is represented by a Rod 14, is held in place on the work table by an Obtuse Angle Bracket 15 bolted to the Flat Trunnion.

Parts required to build the Mechanical Hacksaw: 2 of No. 2; 1 of No. 5; 3 of No. 6a; 2 of No. 10; 1 of No. 11; 4 of No. 12; 1 of No. 15; 1 of No. 15b; 1 of No. 17; 1 of No. 22; 1 of No. 24; 2 of No. 35; 26 of No. 37a; 22 of No. 37b; 5 of No. 38; 4 of No. 48a; 1 of No. 52; 1 of No. 111c; 1 of No. 125; 1 of No. 126a; 1 *Magic* Motor.

Parts required to build the Sports Car: 4 of No. 2; 2 of No. 5; 2 of No. 10; 4 of No. 12; 1 of No. 16; 1 of No. 17; 2 of No. 22; 1 of No. 24; 4 of No. 35; 17 of No. 37a; 17 of No. 37b; 2 of No. 38; 2 of No. 48a; 2 of No. 90a; 2 of No. 126; 1 of No. 126a; 2 of No. 142c.

Now read my invitation in the next column.

"Spanner's" Invitation to Model-Builders

If you are one of the hundreds of model-builders who are in the habit of building the models that I include in this section each month I want you to know that I am anxious to make these pages as interesting as possible for you and to include in them models of a type and size that you will find interesting and which the majority will be able to build with the Outfits they possess.

It would be a great help to me therefore if every model-builder who reads these notes would write to me and let me know the kind of models he likes building, that is, whether he prefers cranes or motor vehicles, as so many boys

do, or is more interested in such subjects as ships, locomotives and machines of various kinds. Perhaps you have no particular preference for a special type of model, but in any case please write to me and let me know your views.

When you write, as I hope you will, please state also the size of your Outfit and your age. Please address your letter to "Spanner,"

Meccano Ltd., Binns Road, Liverpool 13 and let me have it as soon as possible.

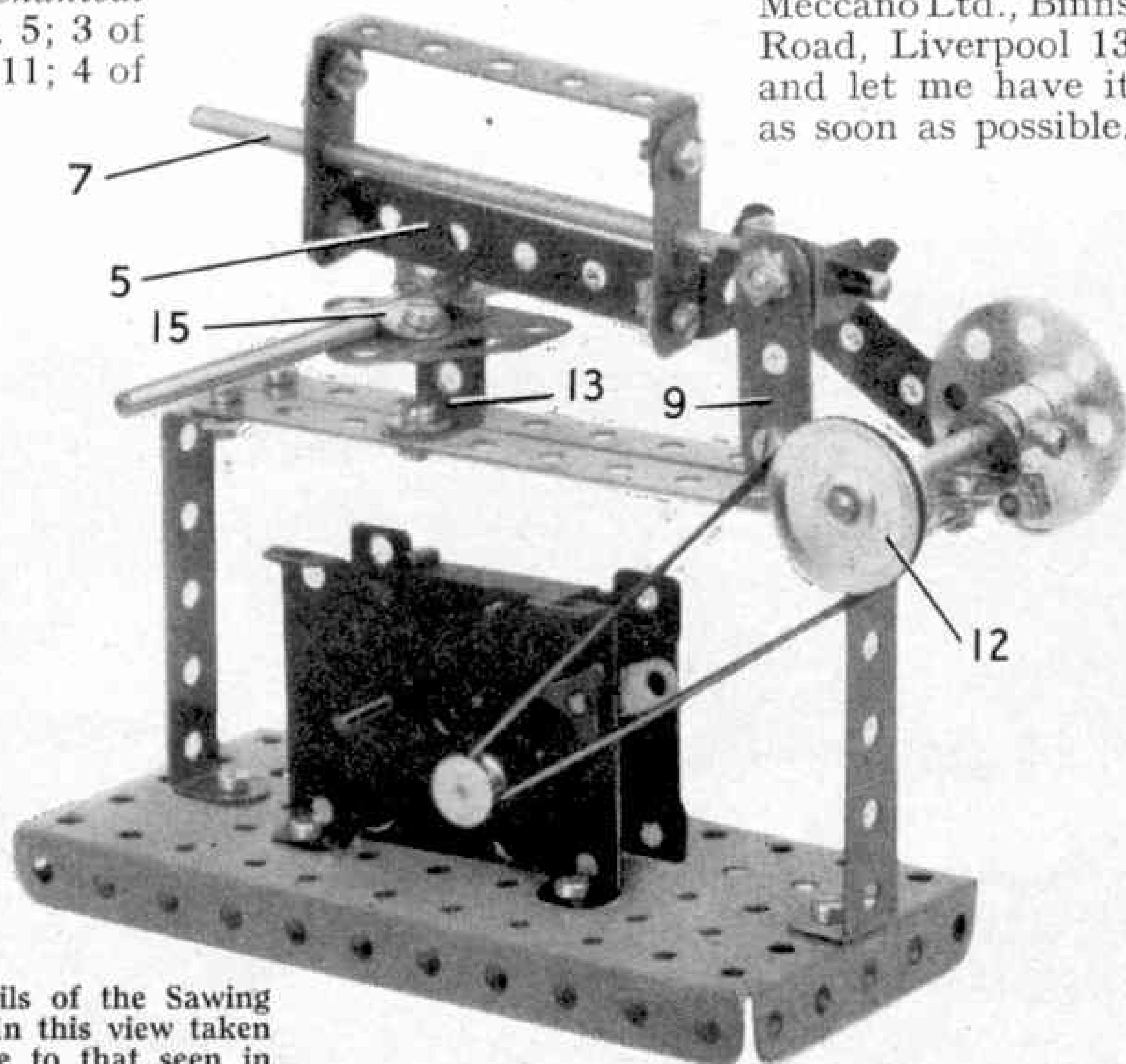


Fig. 3. Further details of the Sawing Machine can be seen in this view taken from the side opposite to that seen in Fig. 2.



DINKY TOYS NEWS

By THE TOYMAN

FUNNY, isn't it, how one thing leads to another? As I was considering a topic for this month's article it began to snow, and the change in the weather made me think about the way in which snow can cause such beauty in the countryside, and such chaos on the roads and railways. (Many of you, I have no doubt, read that excellent feature in last month's *M.M.* on *How Railways Fight Snow*.)

I thought I would arrange a snow scene as one of the pictures to illustrate these notes, and from that it was only a short step to realising that readers might like to arrange such a scene for themselves.

Most of you know the popular song *Walking in a Winter Wonderland*. Well, here is one way in which you can create, in a reasonably small space, a winter wonderland of your own.

You will see from the photograph

Snow that is a menace to motorists still yields thrills for the children. In these notes "The Toyman" tells you how to create this white landscape.

reproduced on this page that winter activities can be arranged fairly simply. Children on sledges are enjoying themselves hugely as they glide down from the high ground on the right. I am not sure about the youngster who is heading straight for a tree, but it looks as though he will fall off before he reaches it—and snow is softer than a tree trunk. Other children are skating—not on thin ice, I hope—and all are having a fine time.

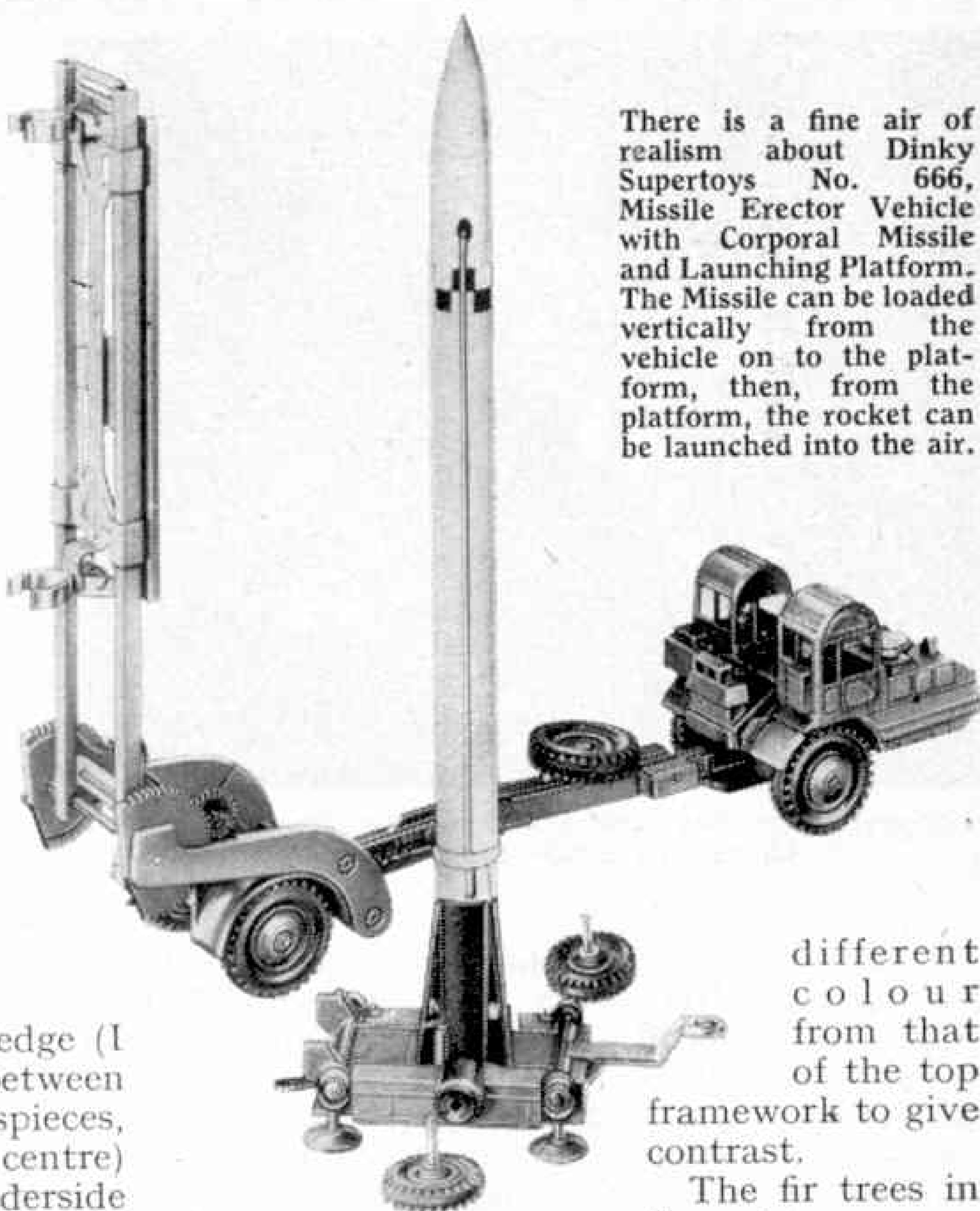
But it is a very different story for the motorists who ventured along the road beyond the hedge. One car,

having overturned, is being hoisted out of a snow-drift by a Breakdown Lorry (in this case Dinky Toys No. 430). An Ambulance has also defied the difficult conditions to pick up the car's injured driver. Meanwhile, a car near the Breakdown Lorry has been abandoned.



There is a great deal of interest to be found in creating a scene of this nature. The snow consists chiefly of cotton-wool. An alternative is salt, a liberal sprinkling of which looks quite realistic. But unless your "snow" is arranged by your parents' permission you might be in for stormier weather still! So, if I were you, I would approach Mum or Dad before using salt, and in any case I should make sure that the salt was confined to the layout rather than, say, the settee or the carpet.

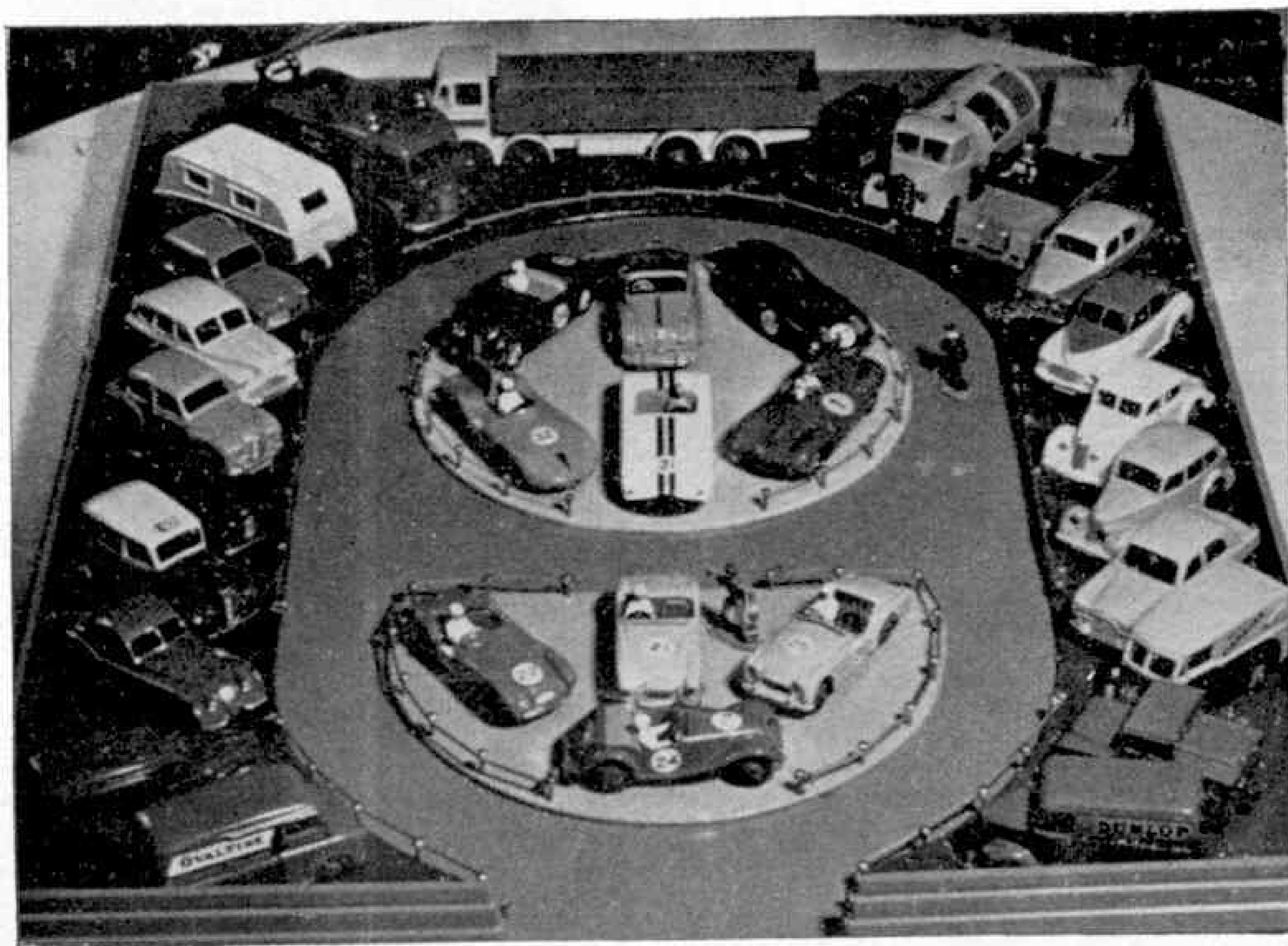
Backgrounds similar to that used in the picture can be bought from model shops, or painted by those who have a bent in that direction, as most children have. The sledges are modelled from coloured pipe spills obtainable from any tobacconist. You simply cut up a spill into short lengths to make the laths of the sledge (I used three laths with a small space between each and joined by three short crosspieces, one at each end and one in the centre) then glue a matchstick along the underside of each outside lath. To the matchsticks you then fasten the runners, the ends of which are cut at a sharp slant to give that racy look. The runners of the sledge are also made from pipe spills and I used a



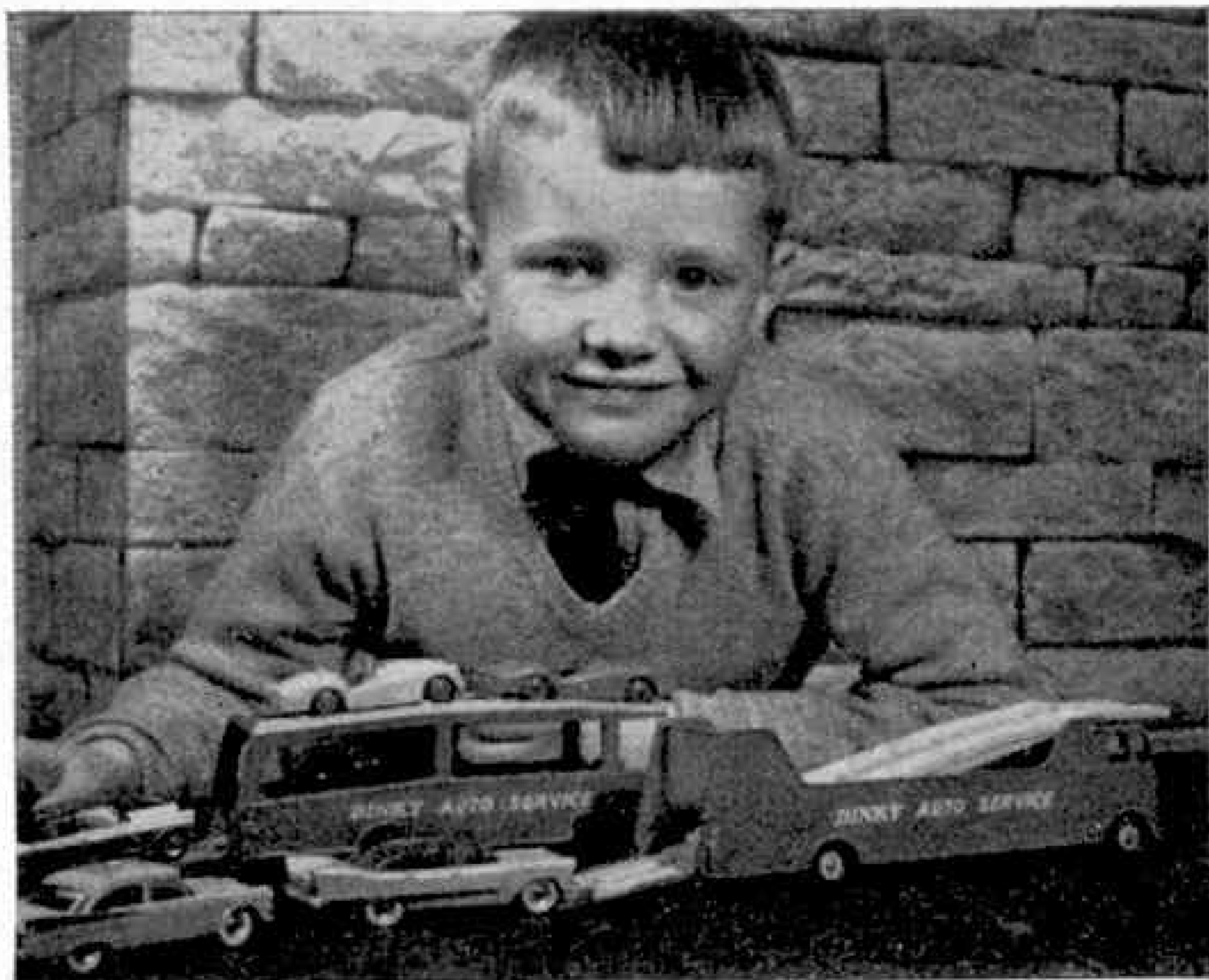
There is a fine air of realism about Dinky Supertoys No. 666, Missile Erector Vehicle with Corporal Missile and Launching Platform. The Missile can be loaded vertically from the vehicle on to the platform, then, from the platform, the rocket can be launched into the air.

different colour from that of the top framework to give contrast.

The fir trees in the picture were borrowed when the Christmas decorations were removed and they will have to be returned in time for next year! You can, of course, buy these decorative trees from



Here is part of the fine array of Dinky Toys owned by Joseph Pujol Plans of Barcelona. Joseph has added later models since this picture was taken and also owns a splendid collection of Army vehicles.



A happy Dinky Toys collector from the Blackpool area is Christopher Astbury of Poulton-le-Fylde.

any stores round about Christmas time. The larger tree was made from a kit. As for the small figures, I first drew them in pencil on stiff cardboard, then outlined and coloured them with ink and crayon, and cut them out. The pond is nothing more than a piece of an old mirror with dabs of white paint on it to represent skate marks. The skaters are lightly glued to the surface of the pond with the aid of tiny wooden blocks. In such a scene as this there is opportunity for you to use a variety of Dinky Toys models.

As in the case of Meccano and Hornby Trains, Dinky Toys have their enthusiasts all over the world. Not long ago I received a letter from Joseph Pujol Plans of Barcelona, part of whose fine collection of Dinky Toys is seen on the previous page. Joseph tells me he has been "dedicated" to collecting Dinky Toys for six years.

I have also had letters from collectors in this country telling me how delighted they are with the Corporal Missile (No. 666). This comprises the Missile Erector Vehicle and the missile itself which you can launch time after time in thrilling fashion. Around Christmas time this model was in short supply because of the great demand, but it is now more freely available in the shops.



In Dinky Rhymes this month I introduce you to another of our popular models—No. 955, Fire Engine with Extending Ladder:

*"Fire. Fire. Fire!" that dreaded shout!
The bells ring in the station;
The bright red engine hurtles out
To save the situation.*

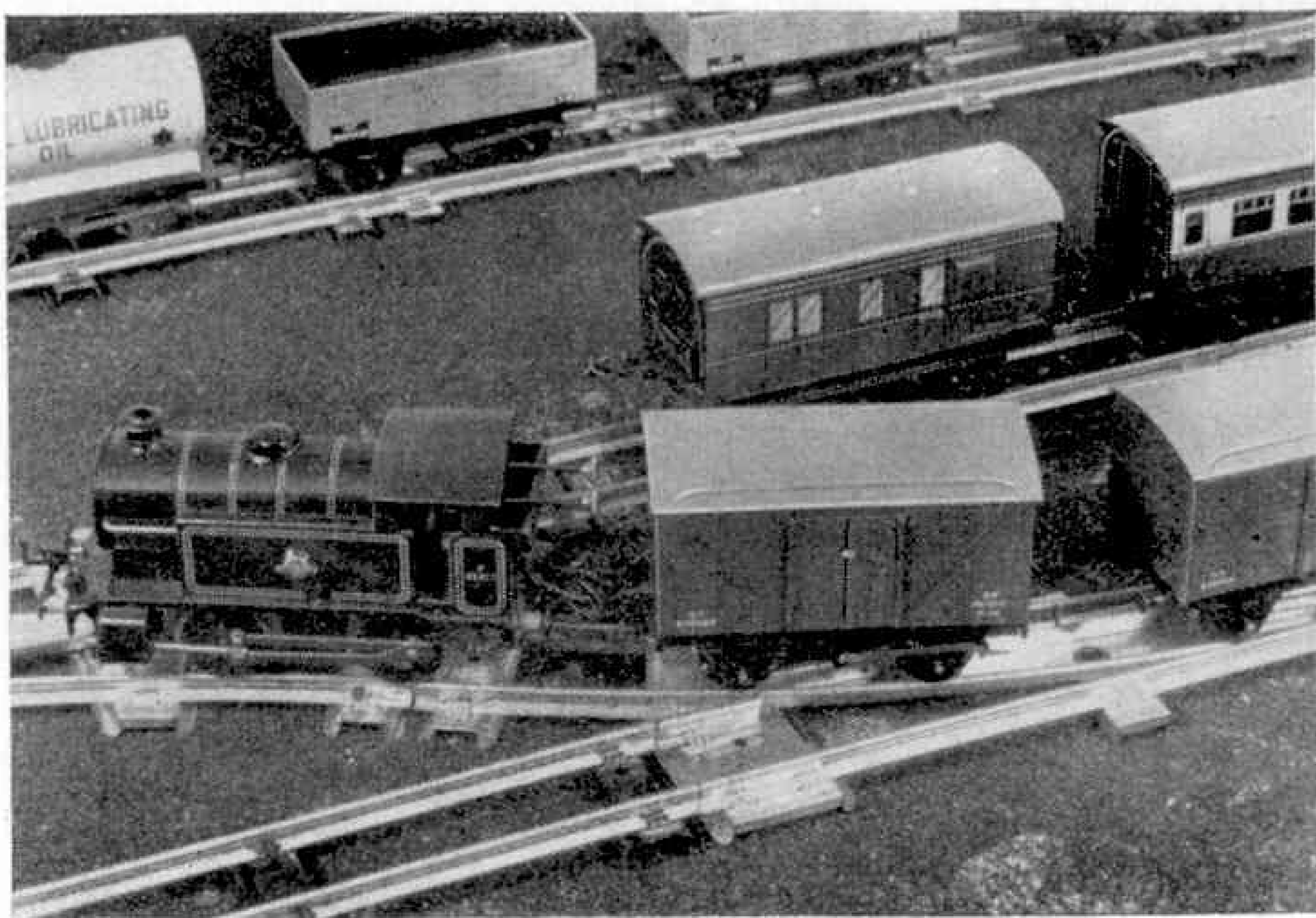


Among those who won awards in our special contest in January were G. Roberson of Thundersley, Essex (top picture) and Robert J. Williams of Exeter. All who are winners in these monthly contests receive £2 worth of Dinky Toys free.



Dinky Rhymes

"Tommy
Dodd"
writes
about:



Filling in the Corners

FROM time to time you have seen in these pages several views of a Hornby Clockwork layout of *M.M.* reader K. Adams, of Gloucester, who owns a remarkable collection of Hornby Gauge 0 equipment some of which dates back twenty-five years and more. This month we have another view of this layout, at the top of the following page. You cannot fail to notice how the space at this particular corner is fully occupied. The railway looks busy, without looking confused in its general appearance.

This is something to which we should give attention on our layouts. It is easy enough, as a rule, to deal with the lineside along the straight stretches of track, but the corners inevitable on the usual oval-shaped continuous railway can look very empty unless we do something about them.

On the railway referred to matters are helped considerably outside the track by the use of a scenic background. Not all of us can aspire to such attractive effects, but scenic sheets can be bought from some model railway shops, or if you fancy your hand at this sort of work, you can probably fix up something quite effective on your own or get someone else to do so. In this

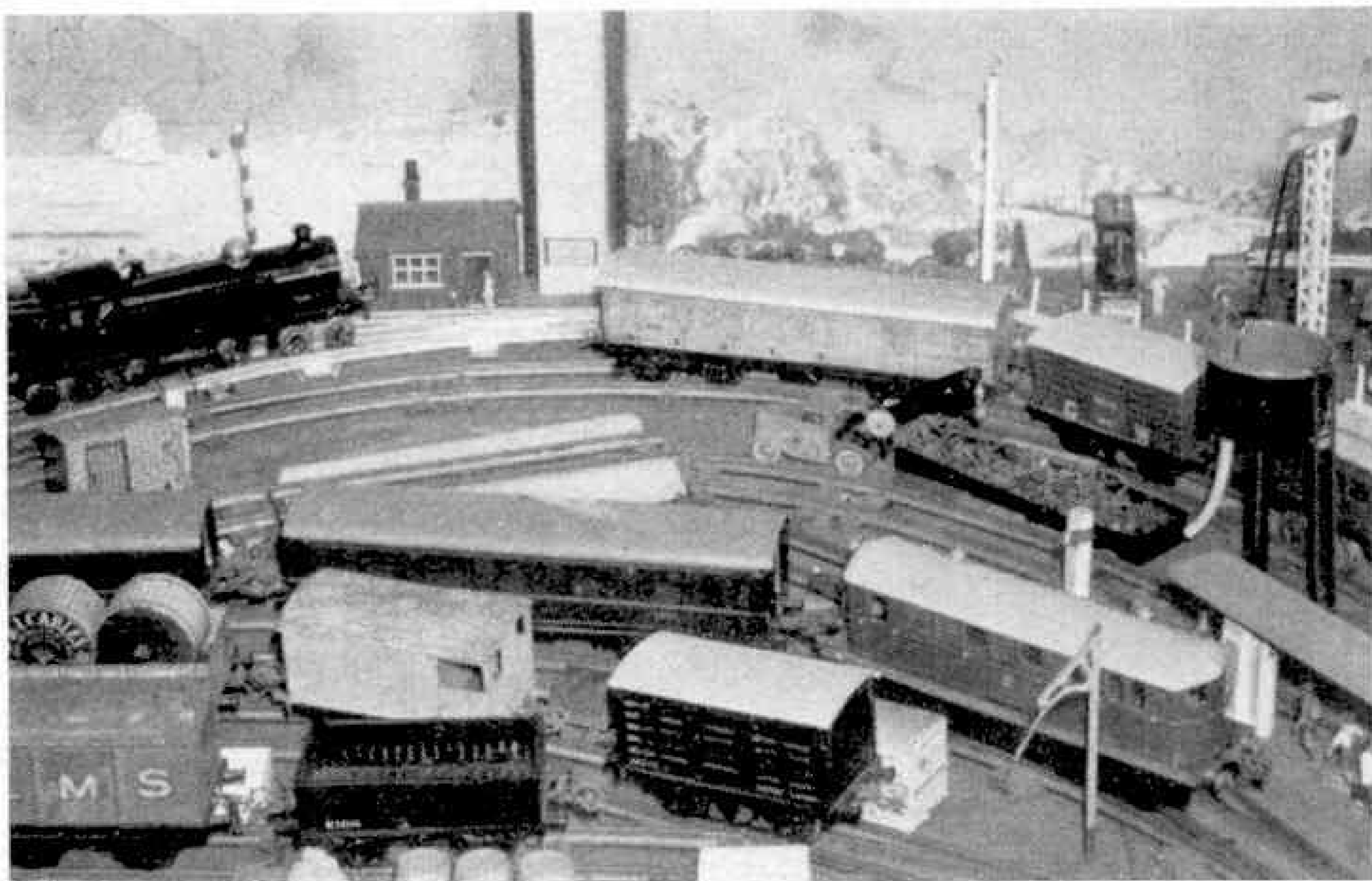
Above, a Hornby No. 40 Tank Locomotive heads a train of Vans through Right-Hand Points that are used together to form a crossover. Such an arrangement is commonly used in the formation of loop lines alongside the main running track.

particular instance the background appears to follow the track, as it were, but it is not always that one can obtain these conditions. The very "squareness" of the railway table or board, or the room in which our railway is, makes the corner rather prominent and miniature railway owners in general frequently have this problem to face, whatever the scale of their layout. Another scheme is to arrange some form of scenic build-up, which can be quite successful. An alternative is to arrange a

building or two, or perhaps even a station, engine depot or something like that in a corner that would otherwise be somewhat bare and this scheme actually is

followed elsewhere on our reader's layout.

Of course there is as a rule space within the oval and how to deal with this depends a good deal on the individual layout. Sometimes sidings help to occupy the "ground" and these can look very neat and effective if they are finished off correctly by Hornby Buffer Stops. Loading platforms and similar items can sometimes be arranged, or alternatively road or field effects are popular schemes nowadays. Exactly what to put down depends on the general character of the system.



A busy corner on the Hornby railway of "M.M." reader K. Adams, Gloucester, with sidings and lineside features, including a scrap metal "dump".

The presence of the various items of merchandise right in the foreground of our reader's photograph suggests that a loading platform is provided at that point. There is evidence of activity at other places too, there being a passenger platform in the right hand corner of the picture. The train drawing in is hauled by one of the Metropolitan type locomotives formerly available in the Hornby system with electric, and with clockwork motive power. The engine shown is actually a clockwork one and in view of its general shape it is now used by the owner to represent a diesel!

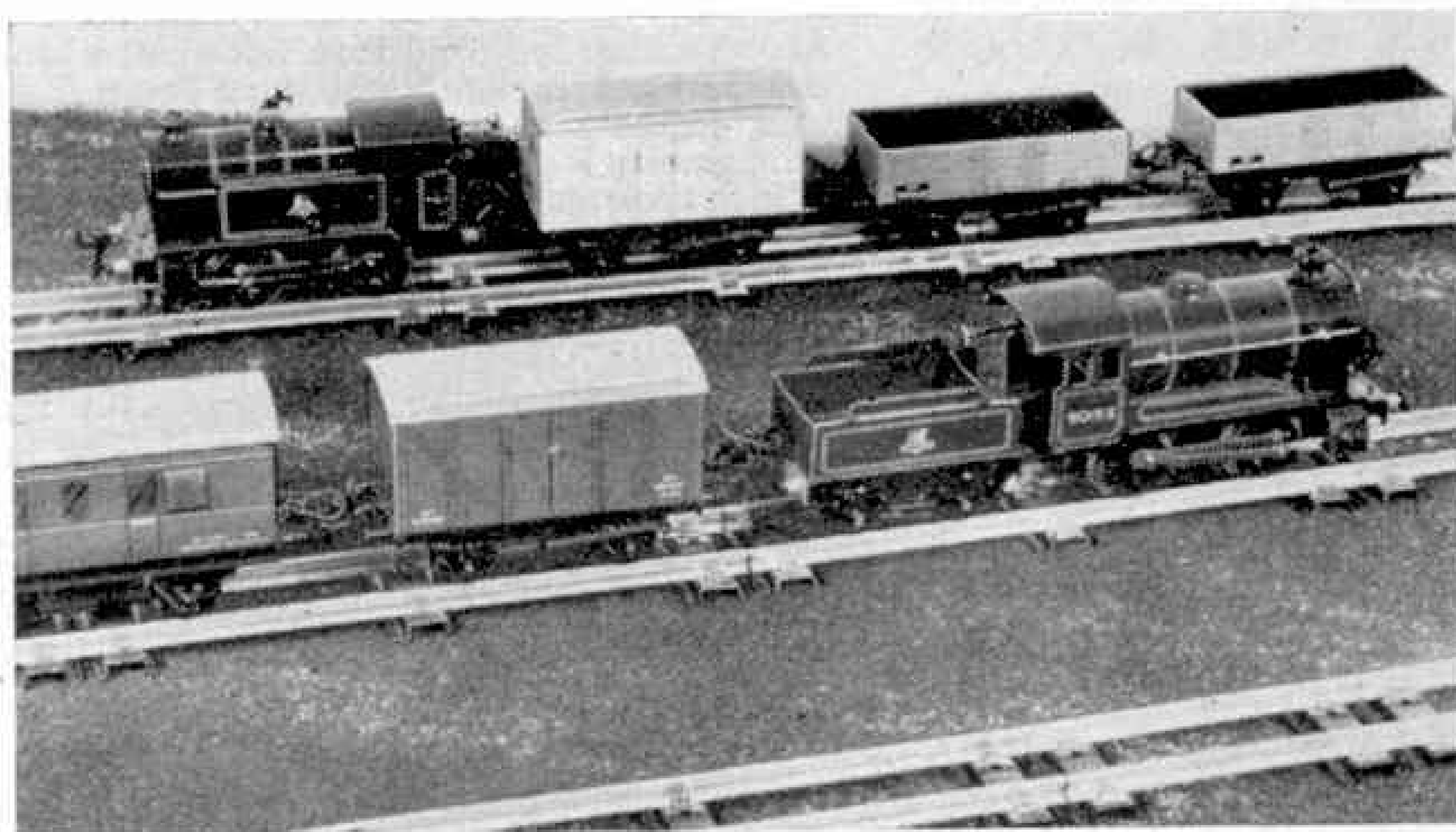
Beyond the train is a more or less vintage type of model lorry adapted as a crane vehicle. The reason for this is apparent when I tell you that it is used in connection with the miniature scrap metal dump that stands between it and the Water Tank. Such dumps are often a feature of railway and industrial premises and you should not find it too difficult to fix one up, if you wish to introduce an item of this kind. The bits and pieces of scrap are in a sense fenced in, which means that in miniature some form of card or wooden structure is necessary. You can use a box of suitable size, cutting down the sides to meet requirements

The base and sides can be painted before you put the thing into use. Black or dark brown to imitate a weathered appearance is necessary.

The "scrap" itself is easy.

Some odd pieces of wire or one or two bits of old toys, a few bent nails and any odds and ends that you are practically certain to come across among your possessions. Almost every miniature railway owner can find such things as bent axles, odd wheels from old rolling stock and so on. Properly treated this sort of thing can be quite convincing.

Good use is made of Points on the layout to lead to various sidings and the owner has not hesitated to introduce curved sidings in order to provide as much storage space for his rolling stock as possible. This will not apply on all layouts, but the arrangement of Points, sidings and loops depends on individual conditions. Some Hornby enthusiasts obtain plenty of variety in running by the incorporation of loop lines.



A Hornby No. 50 Locomotive hustles along with a mixed train of Vans behind the tender. The uses of various Hornby Vans formed a subject of our talk last month.

Of General Interest



A car drives on to the turntable of the ferry boat across Loch Leven, on the West Coast of Scotland. Photograph by F. Bunce, London, who has also provided the notes on it on this page.

Leven will have a fine new bridge connecting both north and south shores, thereby removing the necessity of a ferry service. What is more, it means that people who nowadays do not normally use the ferry service will be saved the 19 miles journey around the loch from South to North Ballachulish, a visual distance across the loch of, perhaps, 200 yards

Unique Ferry Boats

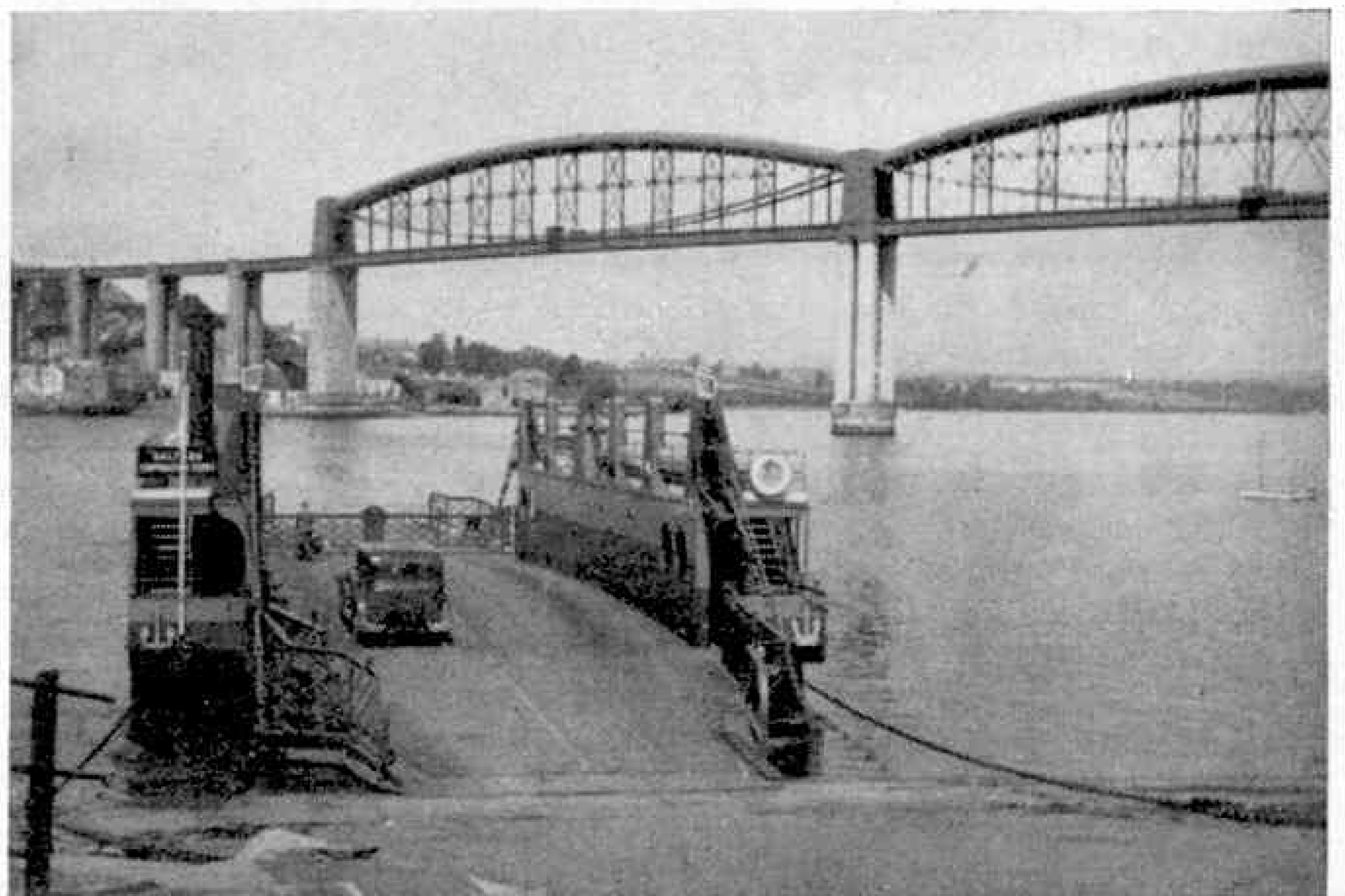
The boats in operation carrying both passengers and vehicles across Loch Leven, connecting the counties of Argyll and Inverness, are of a unique turntable variety. Once the maximum load of four cars is aboard, the turntable is rotated throughout a half circle and the vehicles are then able to drive off in the forward direction. This operation, as distinct from the journey, takes 30 seconds.

This is indeed a far cry from the ferry of fifty years ago, for then provision was made for ferrying a single car only and it was propelled across the waters of the loch on the end of a rowing boat!

If a scheme proposed recently is carried out, then Loch

at the most!

The Tamar, separating Cornwall and Devon, is crossed by a bridge at Saltash, but this is Brunel's Royal Albert Bridge, which carries only railway traffic. Below it is the ferry seen in the lower picture on this page, but some day there may be a road bridge there as well. In this illustration the Tamar ferry is seen from the Devon side of the river.



The Tamar ferry at Saltash, with Brunel's Royal Albert Bridge beyond it. Photograph by Reece Winstone.

Three Miles Down in the "Aluminaut"

Helicopter Submarine to Explore Ocean Depths

By Ian S. Balderstone

THE light reflecting back from the chrome of the instruments contrasts sharply with the blackness that surrounds the tiny boat. The two scientists look anxiously at the fathometer, or depth measurer. They await the reading that will tell them their goal has been reached. They can hear nothing save the motors and the coffee perking on the electric hotplate.

Outside in the darkness they know a pressure of 7,000 pounds per square inch thrusts against the six-inch thick pressure hull. Finally—a bump, a scrape—and again, near silence.

"We're on the bottom," shouts the pilot, as he somehow manages to conquer the dryness in his throat. The two scientists look at each other and nod. The time has come for men to see what lies at the bottom, three miles below the ocean surface. Nervous fingers seek a switch. Powerful lights push back the darkness.

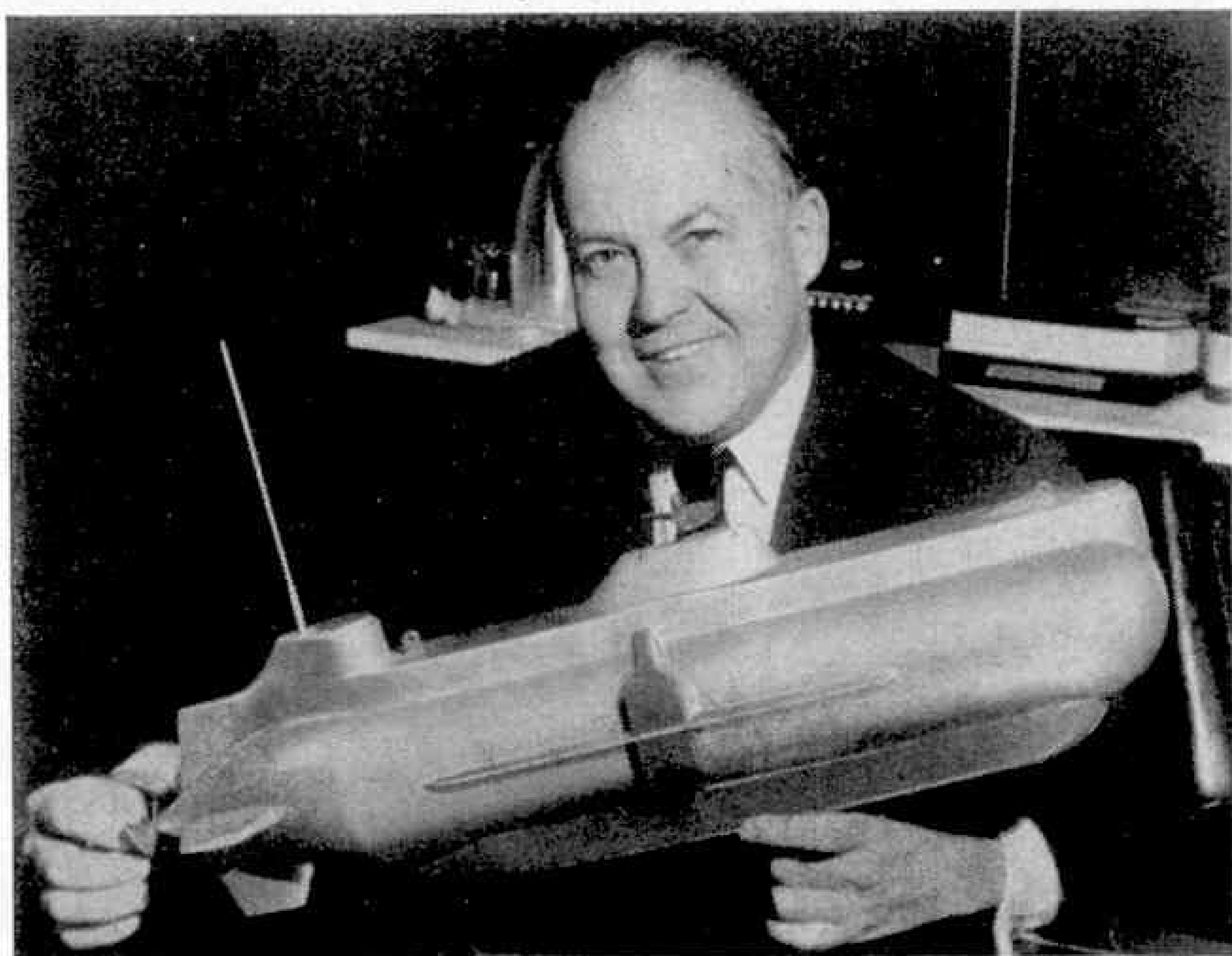
What will they see? What secrets of life will they uncover in the primal ooze that lies at such depths? What new mineral and biological resources will be revealed to them? What new knowledge vital to the West's security will they gather?

In less than two years from now the answers may begin to come in, for the world should then have its first deep diving submarine, the *Aluminaut*, the means for searching the secrets of the deep seas that man has dreaded since he first learned to cross the water.

Work is already under way on the design of this boat, which will carry man at least fifteen times deeper than he has ever ventured before. The Reynolds Metal Company has retained the famed Southwest

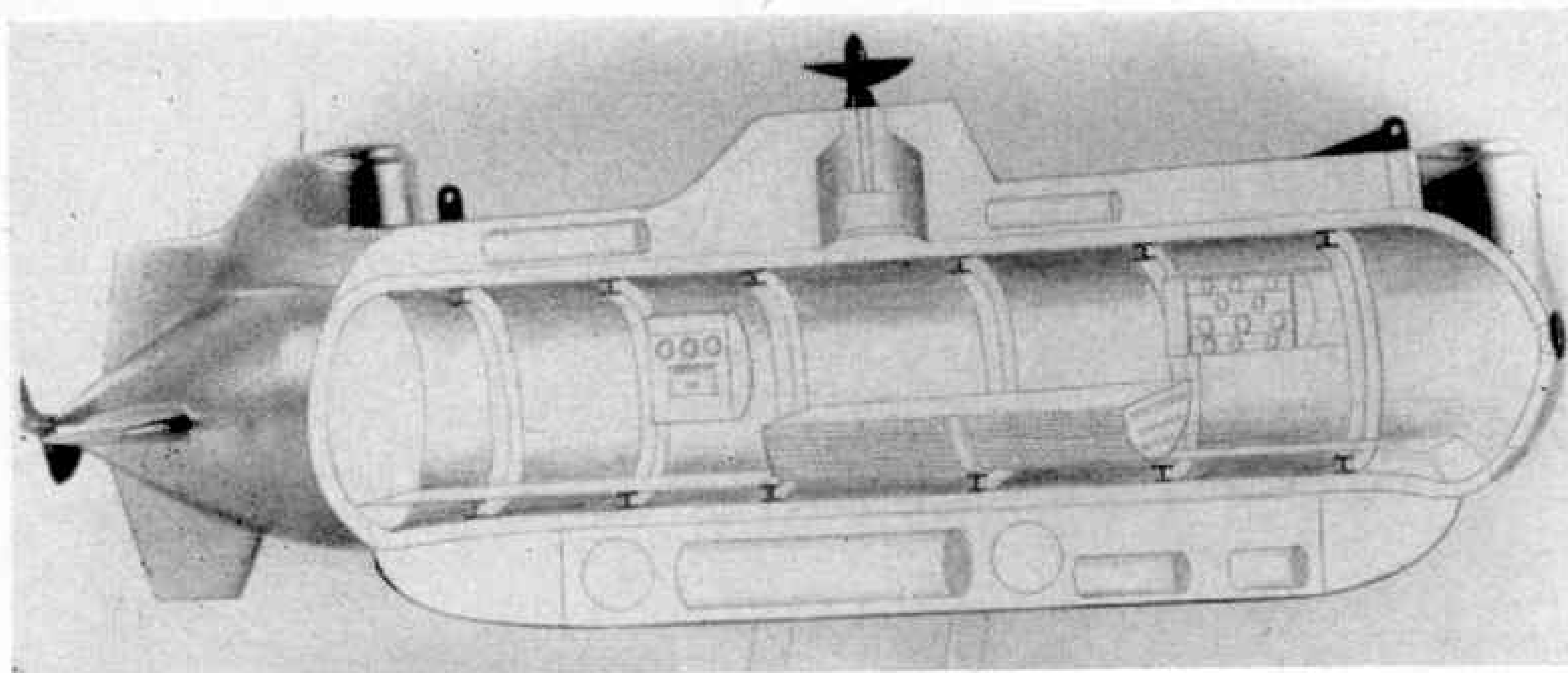
Research Institute to conduct the research and development programme. The Institute is a non-profitmaking body working in the public interest in co-operation with industry, governments and individuals to produce a higher standard of living through science and technology.

For ten years, J. Louis Reynolds, executive Vice-president of the firm that bears his name, has dreamed of the potential research, military and industrial uses of a deep-diving submarine made of aluminium. Heading the Research Institute's panel is Dr. Edward Wenk. These two men have now joined forces and, with the assistance and full co-operation of the U.S. Navy and various oceanographic research bodies, designs are now well advanced to make the deep-diving submarine a reality.



Model of the helicopter submarine, built of aluminium, which is expected to reach depths of up to 18,000 ft. in the sea. The "Aluminaut", as it is called, is being developed by the Southwest Research Institute, an American non-profitmaking body, at the request of the Reynolds Metal Company.

Recently, a bathyscaphe was purchased from Professor Auguste Piccard for use in studies of the ocean bottom. This vehicle is an undersea version of the Piccard stratosphere balloons in that it is basically a gondola suspended from a petrol-filled



A sectional view of the "Aluminaut".

caulked and joined with a special adhesive that is now

blimp. It is extremely fragile, unable to operate in rough seas and has little mobility. It does, however, have a depth potential of 12,000 feet or more, but has little range or payload. Reynolds and Wenk realised that Piccard's bathyscaphe was not capable of undersea exploration on the scale they envisaged. This made them more determined than ever to build into their boat all the refinements necessary to successful undersea operations.

A feasibility study completed last year demonstrated that an aluminium submarine could withstand the tremendous pressures, remain buoyant and carry an effective payload of observers and instruments. It will be about 49 feet long with a 30-ft. cylindrical pressure hull fabricated from 6 in. aluminium plate. Its 7-ft. inside diameter space will house a pilot and two scientific observers, with their payload of more than 3,400 lb. The battery-operated main propulsion system will be mounted in a completely independent stern capsule filled with oil to equalize pressure. In addition to the stern propeller, the boat will also have a vertical propeller which—like that of a helicopter—will permit hovering while making observations, and which will also aid in ascent and descent.

Since its aluminium pressure hull is less compressible than water, an interesting phenomena has been predicted—the boat will not be able to reach the ocean bottom unless it takes on additional water ballast as it descends! It would hover at an intermediate depth unless additional water so introduced effected an increase of weight over buoyancy. Three built-in ballast systems have been provided, with an eye on safety as well as efficiency. These include shot tanks amidships, submergence water tanks in the keel and a solid steel keel ballast that is fail-safe detachable for cases of emergency ascent. The ship will be bolted together and the seams will be

used in bonding the skins of some aircraft.

The *Aluminaut* can be towed to its location even in moderately rough seas at a considerable speed. Its mother ship will probably be an LST. The present design of the boat calls for a depth capability of at least 15,000 ft., but it is expected to be able to operate at 18,000 ft. Down there the men will be able to make direct observations on the cosmic ray penetration of the ocean. They can study the Earth's gravity and magnetic fields, measure currents and water mixing, and learn facts important to an understanding and forecasting of weather phenomena. They can also collect information on life in the deep, and perhaps point the way to using the sea as a source of food to meet the needs of the world's ever-growing population.

The *Aluminaut* should be capable of exploring at a depth of 15,000 ft. for 36 hours, with another 36 hours emergency allowance. It could travel 100 miles through the depths, or along the ocean's floor, before returning to the mother ship or to harbour. Its pressure tanks will be able to simulate pressures up to those encountered at depths of 22,500 ft.

Recent oceanographic studies conducted by deep dredging reveal that the ocean depths are a vast storehouse of chemical and mineral raw materials. The *Aluminaut* could contain master-slave manipulators, that is mechanical hands like those used in handling radioactive substances, which could operate mining or collecting equipment. The operators would make their observations through two thick plastic viewing ports in the hull and, perhaps, later watch the entire scene by means of underwater television.

The first boat will be designed primarily for scientific study, however. The *Aluminaut* could open a vast world of scientific knowledge, and will allow mapping of areas now mysterious to mankind.

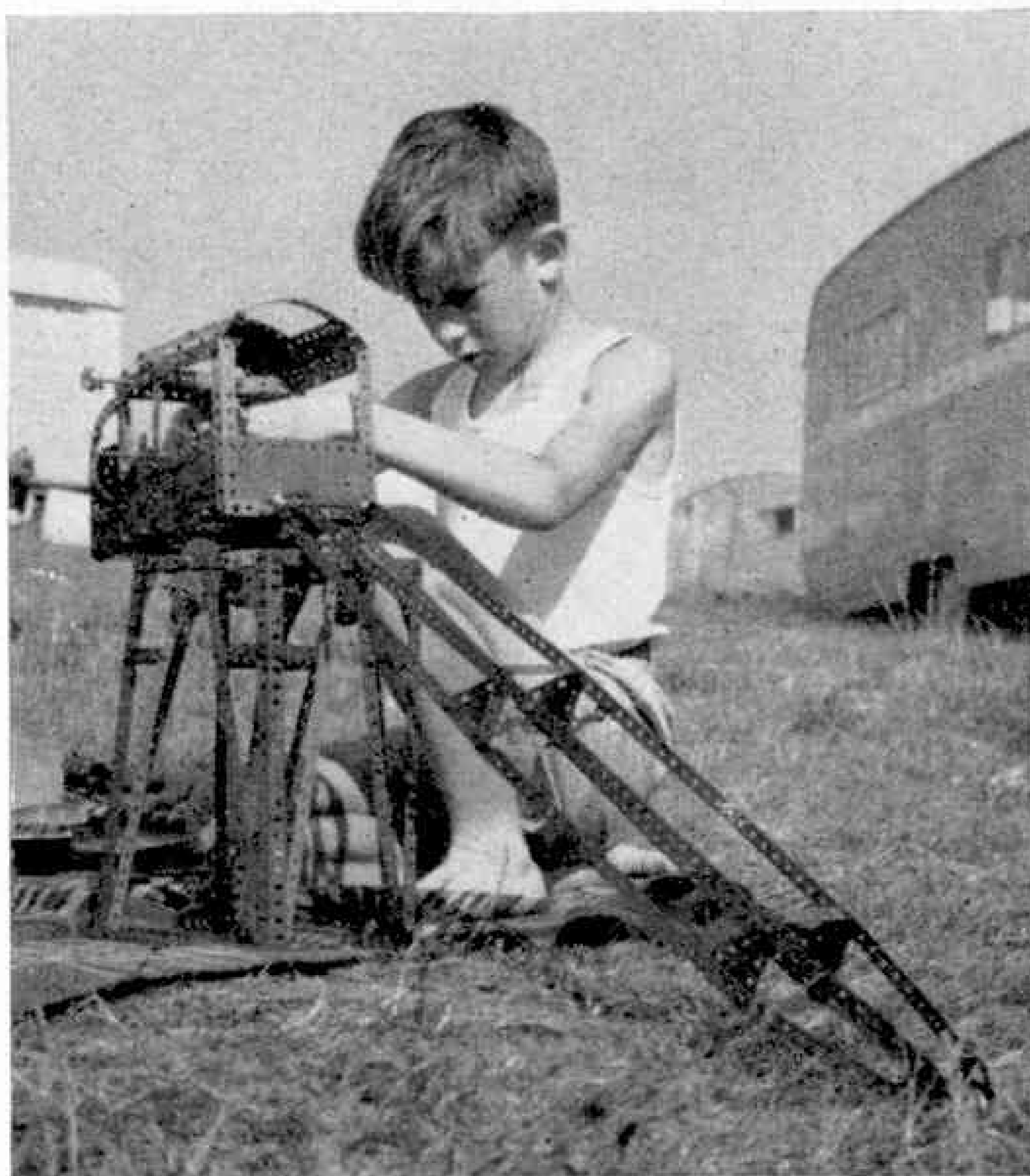
Among the Model-Builders

By "Spanner"

Forward and Reverse Gear-Box

The gear-box seen in Fig. 1 is contained within a framework that consists of two $2\frac{1}{2}" \times 1"$ Double Angle Strips 1 and 2 connected by a $3\frac{1}{2}"$ Strip on one side and by a 3" Strip on the other side.

A 4" Rod 3 is journaled in the centre holes of the Double Angle Strips 1 and 2. The friction clutch 4 consisting of a 1" Pulley Wheel with Rubber Ring, is fixed on this Rod, as is the Contrate Wheel 5. The 57-tooth Gear 6 and another friction clutch 7, consisting of a 1" Pulley Wheel with Rubber Ring, are



Even when on holiday young David Scott, Leyton, E.10, finds time to enjoy Meccano model-building. Here he is seen at work on a model while enjoying the sunshine during a Caravan holiday last year.

fixed in a Socket Coupling, which is free to turn on the Rod 3. An eight-hole Wheel Disc 9 is fixed to a $1\frac{1}{2}"$ Contrate Wheel 16 by means of two $\frac{1}{2}"$ Bolts, and is also free to turn on the Rod 3. The two Pinions 10 and 11 are free to turn on $\frac{3}{4}"$ Bolts held in the frame.

A 1" Rod 12 engages in the groove of the Socket Coupling and is used to slide the Coupling backwards and forwards on the Rod 3. It is moved by means of the 2" Rod 13, which is fixed in a Coupling mounted on the end of a $3\frac{1}{2}"$ Rod journaled in the two $2\frac{1}{2}"$ Flat Girders 14 and 15.

The drive is passed through the gear-box by means of Gear 6. When the Rod 13 is moved backwards, this Gear is forced against clutch 4 fixed to Rod 3. The result is that the $1\frac{1}{2}"$ Contrate Wheel 16 revolves idly on the shaft and the drive is transmitted through Gear 6. When the lever 13 is pushed forwards the Rubber Ring on clutch 7 transmits a reverse drive through the Contrate 6, Pinions 10 and 11 and the Contrate 5.

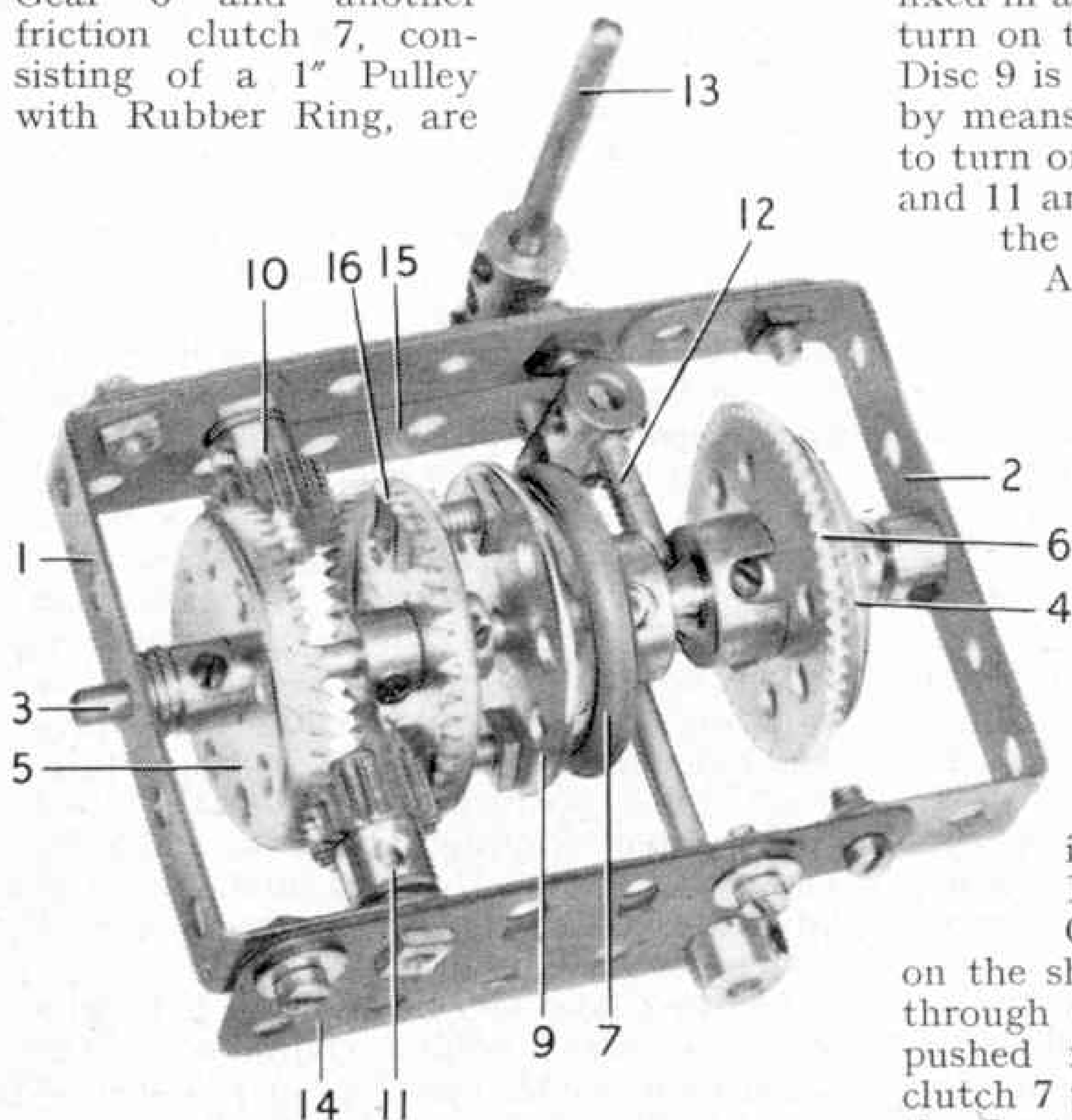


Fig. 1. A forward and reverse gear-box of a simple and unusual type.

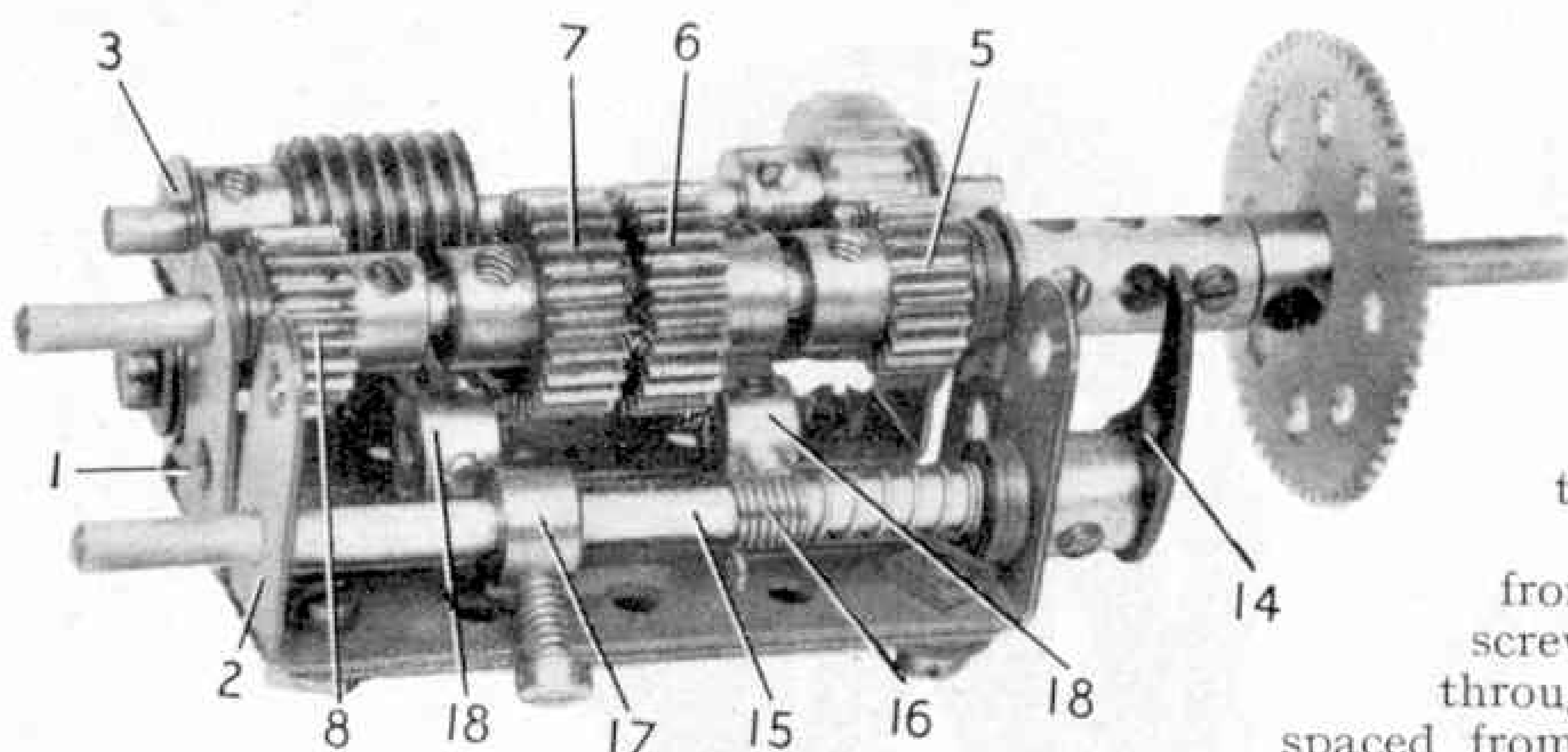


Fig. 2. A self-changing gear-box designed by R. M. Minshull, Macclesfield.

A Self-Changing Gear-Box

Figs. 1 and 2 on this page show another variation of the three-speed gear-box, to add to the many already described in past issues of the *Meccano Magazine*. The one illustrated here, however, is a self-changing type, and it was designed by R. M. Minshull, Macclesfield.

Readers who wish to build this mechanism should begin by bolting together two $2\frac{1}{2}$ " Flat Girders through their round holes. The bolts joining the Flat Girders are used to fix also two $1" \times 1"$ Angle Brackets 1. Two $2\frac{1}{2}" \times 1"$ Double Angle Strips 2 and 3 are then attached to the slotted holes of the Flat Girders. The slotted holes enable the Double Angle Strips to be positioned so that a $\frac{3}{4}"$ Pinion on a Rod mounted in either of them meshes accurately with a $\frac{1}{2}"$ Pinion on a Rod supported in the Angle Brackets 1.

The input shaft is a Rod 4 passed through one of the Angle Brackets 1. The Rod carries four Washers, a $\frac{1}{2}"$ Pinion 5 and a $\frac{3}{4}"$ Pinion 6. The Rod 4 projects about $\frac{1}{4}"$ beyond the Pinion 6 into a $\frac{3}{4}"$ Pinion 7 on the output shaft. This shaft carries also a $\frac{1}{2}"$ Pinion 8, which is spaced from the Angle Bracket 1 by three Washers.

The layshaft is a $3\frac{1}{2}"$ Rod 9, fitted with a $\frac{3}{4}"$ Pinion 10, two $\frac{1}{2}"$ Pinions 11 and 12 and a $\frac{3}{4}"$ Pinion 13. The layshaft carries two Collars with the end of a Pawl 14 located between them. The Pawl is fixed on a $3\frac{1}{2}"$ Rod 15, which is fitted with

three Washers, a Compression Spring, a Cord Anchoring Spring 16 and a Collar 17. A $\frac{3}{8}"$ Bolt in the Collar bears against the housing and serves to keep the Pawl 14 between the Collars on the layshaft.

Two "spiders" 18, taken from Swivel Bearings, are screwed on to bolts passed through the housing, but are spaced from it by two Washers on each bolt. A $1"$ Screwed Rod is threaded through each spider, and is fitted with a $\frac{1}{2}"$ Pinion 19. A $\frac{1}{2}"$ Pinion 20 is free to turn on a $\frac{3}{4}"$ Bolt, which is held by two nuts in a $2\frac{1}{2}"$ Strip. The Strip is attached to the framework by Angle Brackets. A $3\frac{1}{2}"$ Rod is supported in the Double Angle Strip 3, and a $\frac{3}{4}"$ Pinion on the Rod engages the Pinion 5 on the input shaft. A Worm on the Rod drives one of the Pinions 19.

The mechanism is set by pushing the Rod 15 to the right (Fig. 1) and then turning the Screwed Rods until they just touch the Rod 15. The gear-box is then in bottom gear, and the Rod 15 is prevented from moving to the left by the Screwed Rod catching against the Cord Anchoring Spring 16. When the model is set in motion, the Screwed Rods rotate slowly, and gradually the Cord Anchoring Spring is released. The Rod 15 is then forced to the left by the Compression Spring and second gear is engaged. The second Screwed Rod now catches against the Collar 17, but as the Screwed Rod turns it is slowly withdrawn from the Collar, until the Compression Spring can force the Rod 15 to the extreme left to engage top gear.

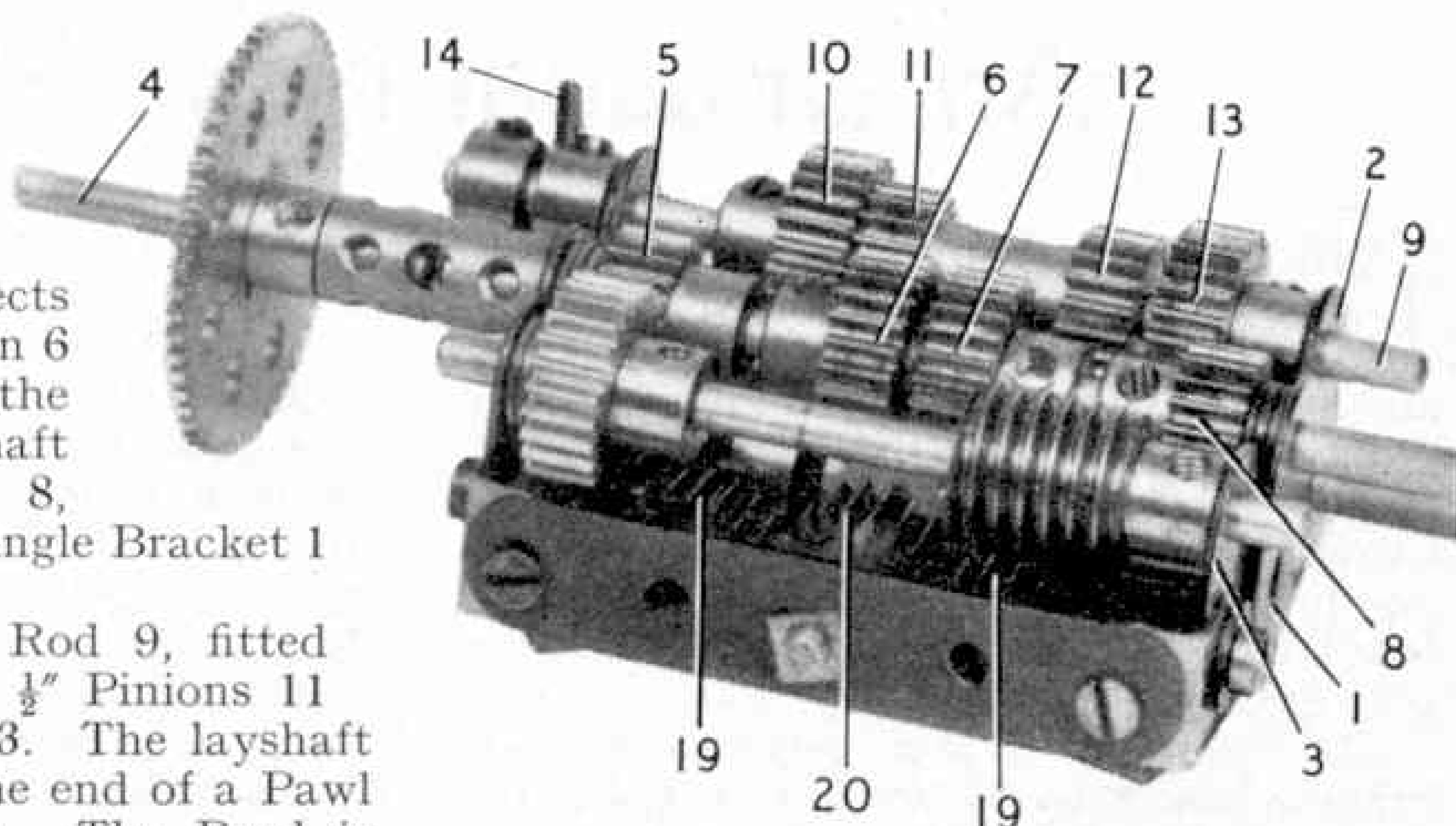


Fig. 3. The self-changing gear-box seen from the side opposite to that seen in Fig. 2.

Spinning Wheel

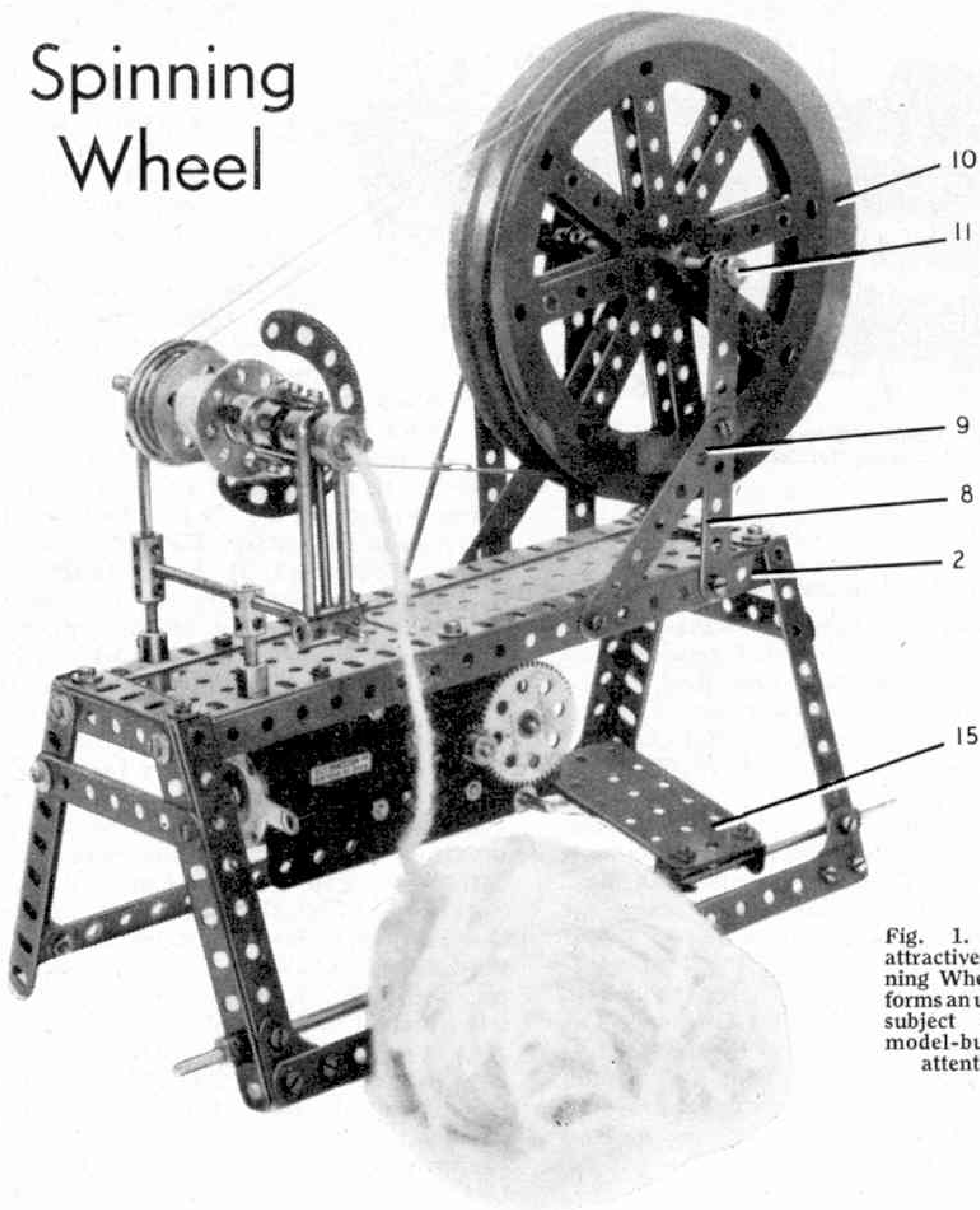


Fig. 1. An attractive Spinning Wheel that forms an unusual subject for a model-builder's attention.

An Unusual New Model

THE rectangular table of the Spinning Wheel shown in Figs. 1, 2 and 3 is built from two $9\frac{1}{2}$ " Angle Girders 1 and 2, and two $2\frac{1}{2}$ " Angle Girders 3 and 4, and is filled in with a $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " and a $4\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flat Plate. At each corner a $4\frac{1}{2}$ " Angle Girder 5 is bolted, braced by a $3\frac{1}{2}$ " Strip 6 and joined at the lower ends by $9\frac{1}{2}$ " Strips 7, the latter having 1" Corner Brackets to give extra support.

The Spinning Wheel bearings are $4\frac{1}{2}$ " Strips 8 braced by $3\frac{1}{2}$ " Strips 9 bolted to the Angle Girders 1 and 2.

Two 6" Pulley Wheels 10 are placed on a

$4\frac{1}{2}$ " Rod 11 held in place with Collars. A 2" Pulley Wheel and a Crank 12 are also fixed to the Rod. A $6\frac{1}{2}$ " compound Strip is lock-nutted to the Crank at one end and to an Angle Bracket 13 at the other, and this in turn is lock-nutted to another Angle Bracket 14 bolted to a 3" Strip attached to a $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Plate 15. Next, a $1\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip is bolted to the Plate, which pivots on a $11\frac{1}{2}$ " Rod supported in the Angle Girders 5.

An E15R Electric Motor is bolted to the Angle Girders 1 and 2. A $\frac{1}{2}$ " Pinion on its armature shaft drives a 57-tooth Gear

Wheel, on the Rod of which is also a $\frac{7}{16}$ " Pinion that drives a 60-tooth Gear Wheel. The 1" Pulley is connected to the 2" Pulley with a 15" Driving Band.

On a 3" Rod 16 a $1\frac{1}{2}$ " Pulley 17 is fixed. A Bush Wheel 18 and a $1\frac{1}{8}$ " Flanged Wheel 19 are secured in a Socket Coupling 20, which is placed loosely on Rod 16 and held clear of the $1\frac{1}{2}$ " Pulley by means of a Collar.

Two Socket Couplings 21 and 22 are joined together with two Fishplates, Washers being used on the bolt shanks so that the bolts do not foul the Collars inserted in each end of the Socket Couplings. *The Collars in the Socket Coupling 21 are fixed to the Rod 16. The Collars in Socket Coupling 22 are held with Grub Screws forming a hollow shaft.*

Two $2\frac{1}{2}$ " Stepped Curved Strips 23 are held in place by two nuts on a $\frac{3}{4}$ " Bolt 24 that is fastened in the Socket Coupling with a Nut and Washer. This entire unit is mounted loosely on a Rod journalled in Coupling 25 and the Bearing 26, which is made from two $2\frac{1}{2}$ " Rods and a 2" Screwed Rod fixed in Coupling 27. Two Rod Sockets are fixed to the Angle Girders 1 and 2, and carry 1" Rods on which are mounted a Coupling and a Short Coupling. A $3\frac{1}{2}$ " Rod 28 passes through these as shown. The Coupling also holds a $1\frac{1}{2}$ " Rod and the Coupling 25. *The Rod 16 must rotate very freely.* A length of cord is used to connect one of the 6" Pulleys to the $1\frac{1}{2}$ " Pulley, and a further length of cord connects the other 6" Pulley to the Flanged Wheel.

To get the Wheel ready for working unspun wool is threaded through both Collars in the Socket Coupling 22, through the end hole of one of the Curved Strips 23, and fastened to the Socket Coupling 20.

The correct material for use with this model is raw wool, and small supplies of this can usually be collected from barbed wire fences in fields where sheep have been grazing. Alternatively, you might be able to persuade a farmer to give you a handful or two from a fleece. *Ordinary cotton will not do, but the kind used by chiropodists will be satisfactory.*

Before the wool can be spun it must be

"teased" with the fingers, pulling the wool out from its matted state, and afterwards "carded".

For carding, a pair of "cards" is needed. These are two flat pieces of wood with handles, like table tennis bats, only square. If possible the wood should be covered on one side with leather, or leathercloth, into which is inserted over the whole surface bent wires turning towards the handle.

Take one card in your left hand, placing it on your lap with the wires uppermost and the handle pointing to the left. On this you place a small portion of wool. Now, with the other card in the right hand, the handle pointing to the right, you draw this several times across the left card until almost all the wool is on the right-hand card. This is then returned to the left-hand card by turning this card and pointing both handles towards you, then pushing the right-hand card across the other. This process is repeated several times, and then the wool

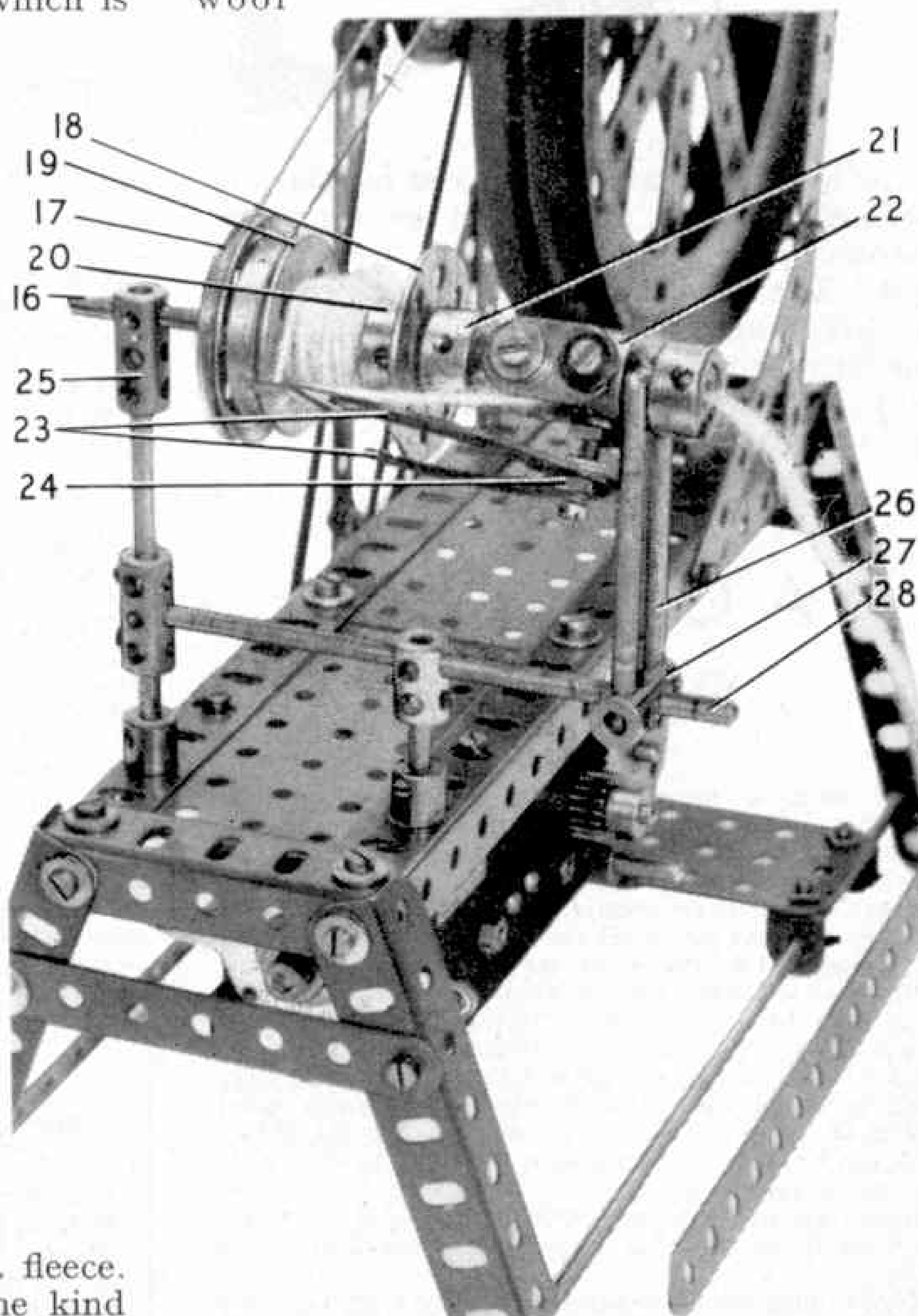
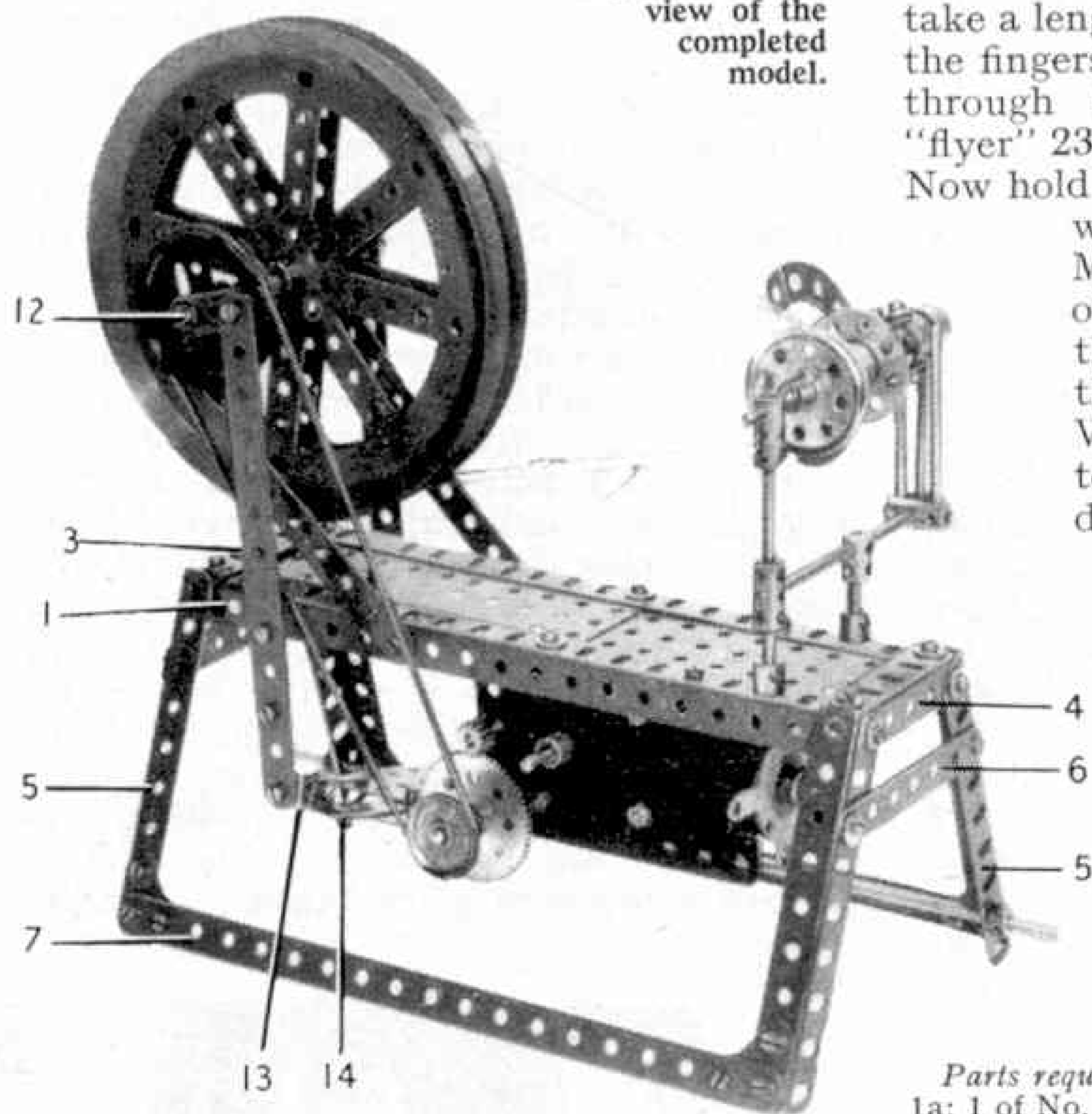


Fig. 2. A close-up of the "mechanism" of the Spinning Wheel.

Fig. 3. Another view of the completed model.



on the left-hand card is removed by placing the cards at right angles and scraping the left-hand card down across the edge of the right. The wool is now lifted, by drawing the left-hand card lightly upwards, and then dropped on to the back of the right-hand card, where it is rolled between the two card backs into a neat roll.

Now the actual spinning may be started: take a length of the roll, twisting it between the fingers to form a thread, and thread it through the Socket Coupling 22, the "flyer" 23, and then tie it to the bobbin 20. Now hold the wool near the spindle lightly with the left hand, and start the Motor. With the right hand, draw out a few inches of fleece, relax the hold of the left hand, and let the yarn run on to the bobbin. With practice it becomes possible to expose a longer stretch of drawn-out fleece, and a delightfully rhythmical movement results as the right hand moves first from, and then towards, the left.

You may practice by twisting together two threads of two-ply wool of different colours to get the idea of obtaining even twist. When doing this it is better to run the spindle *anti-clockwise*, and *clockwise* when using wool.

Parts required to build the Spinning Wheel: 2 of No. 1a; 1 of No. 2; 2 of No. 2a; 4 of No. 3; 2 of No. 4; 1 of No. 5; 2 of No. 8a; 4 of No. 9a; 2 of No. 9d; 2 of No. 10; 2 of No. 12; 1 of No. 13; 1 of No. 15a; 1 of No. 15b; 2 of No. 16; 3 of No. 16a; 1 of No. 17; 2 of No. 18b; 2 of No. 19c; 1 of No. 20; 1 of No. 20a; 1 of No. 21; 1 of No. 22; 1 of No. 24; 1 of No. 26; 1 of No. 26c; 1 of No. 27a; 1 of No. 27d; 2 of No. 35; 50 of No. 37a; 45 of No. 37b; 24 of No. 38; 1 of No. 48a; 1 of No. 53a; 9 of No. 59; 1 of No. 62; 3 of No. 63; 1 of No. 63d; 1 of No. 70; 1 of No. 73; 2 of No. 81; 2 of No. 90a; 1 of No. 111; 3 of No. 111c; 4 of No. 133a; 3 of No. 171; 2 of No. 179; 1 of No. 186d; 1 E15R Electric Motor.

A Competition Reminder

WE wish to remind all Meccano model-builders that there is still time to prepare and send in entries for the "Winter Model-Building Competition", of which details were given in last month's *M.M.* In this Contest every competitor, no matter what his age may be, has an equal chance of winning a prize, and it does not matter what size of Outfit he possesses.

All that a reader has to do is to think of a new model and then to set to work to construct it as neatly and realistically as possible from standard Meccano parts. When he has completed this model, the next thing is to obtain either a photograph or a good sketch of it, and send this to us. The actual model must not be sent. If a photograph cannot be obtained, and an entrant is not good at sketching, he can ask a friend to make a sketch of the model for him, provided of course that the model itself is his own work.

The Competition is open to readers of all ages living in any part of the world, and will be divided into two Sections, as follows: A, for competitors under 14 years of age; B, for competitors aged 14 years

or over. A separate set of prizes, as announced in the accompanying panel on this page, will be awarded in each Section.

The judges will award the prizes for those models that are the most original in subject, well proportioned and built on correct mechanical principles.

Choose any subject you like for your model, but be careful to select one that you can reproduce realistically with the Outfit you possess. It will also help you on the way to success if you choose a model that "works".

Before posting your entry write your age, name and address on the back of each photograph or drawing. Address the envelope "Winter Model-Building Competition, Meccano Ltd., Binns Road, Liverpool 13." Closing date: 31st May next.

THE PRIZES

The following prizes will be awarded in each of the Sections A and B:

First Prize, cheque for	..	..	£4	4	0
Second Prize, cheque for	..	..	£2	2	0
Third Prize, cheque for	..	..	£1	1	0
Five Prizes each of 10s. 6d.					
Five Prizes each of 5s. 0d.					

Certificates of Merit also will be awarded.



Club and Branch News



WITH THE SECRETARY

Preparing for the Outdoor Season

With two-thirds of the second Winter Session now past it is time to begin planning outings for the Summer months ahead, so that at the end of this Session a rough draft of the proposed programme can be put before the members, their views obtained, and changes made if desirable. There is, too, the question of funds for such outings. Some Clubs and Branches very wisely run a permanent Outings Fund, maintained by a levy of 1d. or 2d. a week per member throughout the year, which can be drawn upon to meet the incidental expenses of outings like rambles, cycle runs, visits to bathing pools, and so on. I advise new Clubs and Branches to adopt this excellent plan, if they have not yet started anything of the kind. More ambitious excursions, involving travel by rail or coach, are generally financed by those taking part paying an agreed sum toward the cost.

CLUB NOTES

AUSTRALIA

FREMANTLE AND DISTRICT M.C.—The end of 1959 was celebrated with the traditional Christmas Party. The Red faction won the shield in the model-building contest. A very useful collection of Meccano parts has been added to the Club stock. Many interesting activities have been planned for 1960. *Secretary:* Mr. M. R. Hughes, 6 Bolton Street, East Fremantle, Western Australia.

INDIA

MYSORE M.C.—Model-building has continued, and enthusiasm has been well maintained. Mr. F. D. Aria, a veteran Meccano enthusiast in Bombay, has presented to the Club bound volumes of the *Meccano Magazine*, *Trains*, etc., some dating back to 1926, together with Meccano booklets and literature of pre-war days—a most welcome addition to the Club library. *Secretary:* Mr. M. N. Radhakrishna, 16 Mothikhana Building, Santhepet, Mysore-1, India.

NEW ZEALAND

CHRISTCHURCH M.C.—A good display of working models was shown

Mr. Gerald Nabarro, M.P. for Kidderminster, is here seen drawing attention to a point of interest during track operations at the Kidderminster Model Railway Club (H.R.C. Branch No. 560). He was elected President of the Club last October. Photograph by Mumford, Kidderminster.



by the Club at the Christchurch South Intermediate School Fair. There was a record attendance of visitors. Just before Christmas the Club also staged a working display of Meccano models and Trains at Messrs. Ballantyne, one of the largest shops in Christchurch. A competition for home-built models produced some excellent results. Hornby-Dublo operations, Table Tennis and other indoor games have ensured a varied programme. *Secretary:* R. Boundy, 25 McBratneys Road, Dallington, Christchurch, New Zealand.

BRANCH NEWS

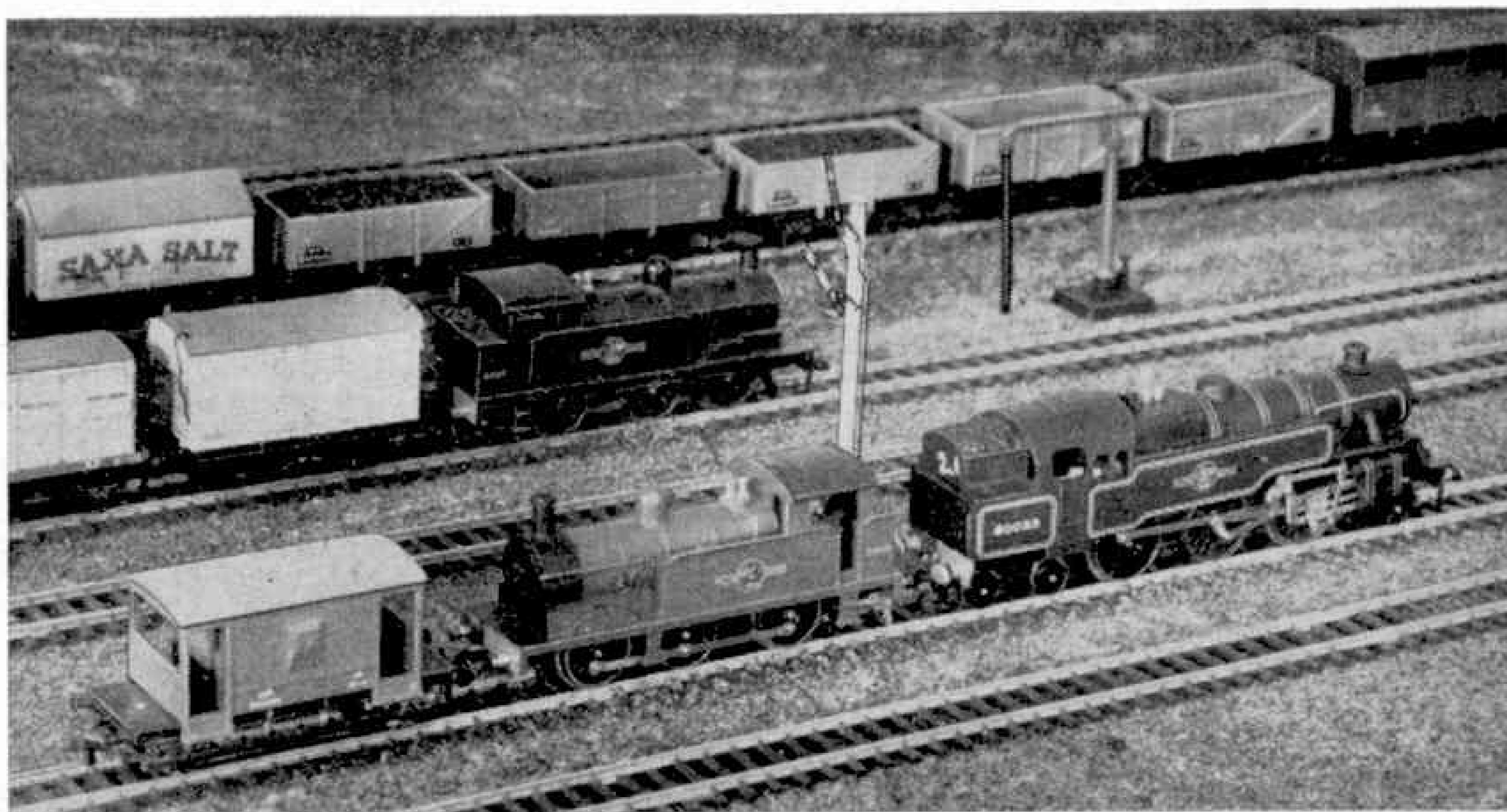
NORTH END (PORTSMOUTH).—Work has begun on extending the Branch layout. A few adult members have joined the Branch, and are giving very useful assistance. *Secretary:* Mr. A. J. Nicholson, 213 Sultan Road, Buckland, Portsmouth.

NEWPORT (I.O.W.) C. OF E. JUNIOR BOYS' SCHOOL.—Meetings are held on Friday afternoons, immediately after school. Six locomotives are in use at track meetings, and the layout includes four large stations and a small one. Work has begun on the construction of a dockside station. *Secretary:* C. Blow, C. of E. Junior Boys' School, West Street, Newport, I.O.W.

AVIARY MODEL RAILWAY CLUB (LEEDS).—The Annual Christmas Party was a great success, and the evening was spent in playing games and singing carols. Modelling activities during the past year have resulted in the layout now having a much more finished look. *Secretary:* J. Baker, 10 Salisbury Terrace, Leeds 12.

AUSTRALIA

ST. KEVIN'S COLLEGE (MELBOURNE).—Highlights of the past year's programme were the Annual Rail-Car Excursion to Katamatite, 147 miles from Melbourne; the Annual Film Show night, which was attended by 130 people and made a profit of £10; and the visit to the quarry of Australian Cement Ltd. at Fyansford. The Branch is now affiliated to several railway club associations in Australia. *Secretary:* W. V. P. Hunt, 12 Grange Road, Kew, E.4, Victoria, Australia.



HORNBY RAILWAY COMPANY

By the Secretary

The Engine of the Hornby-Dublo "Caledonian"

I HAVE spoken to you before, briefly, about the newest Train Sets in the Hornby-Dublo Two-Rail system, *The Caledonian* and *The Talisman* respectively. Now I have the pleasant task of telling you more about the very fine new 4-6-2 Locomotive, L.M.R. *City of London*, that is contained in the former of the two Sets.

In Hornby-Dublo, as in real practice, *City of London* is a close relative of the well-known and popular *Duchess of Montrose*. In introducing the L.M.R. class 8 in Two-Rail form the opportunity has been taken of modelling one of the "City" series of 4-6-2s, and one with the characteristic cut-away section in the foot framing in front of the smoke-box. This rather novel feature, for a model, gives the engine a particularly bold appearance when viewed from the front and it does contribute to its business-like appearance when viewed from the side.

Another distinction is that the Hornby-Dublo "City" is correctly finished in the maroon livery that has been adopted for selected members of the L.M.R. Stanier 4-6-2 classes. The real *City of London* was the first engine of its class to which this livery was given. The Hornby-Dublo

Above, Two-Rail working of a kind not normally possible in Three-Rail can be seen—two Hornby-Dublo Tanks, a 2-6-4 and an 0-6-0, running coupled bunker to bunker. In the sidings beyond, another 0-6-0 Tank is dealing with a meat train.

"City" is given a particularly attractive appearance by the use of this colour, and the principal linings adopted on the real engine appear also on the miniature one. The housing, or body of the Locomotive, is a die-casting, and many Hornby-Dublo owners will detect various improvements that have become possible since the original design was prepared for *Duchess of Atholl*, which preceded the present Three-Rail *Duchess of Montrose*.

To mention just one or two items, some rivet heads are well represented where appropriate, and a pleasing "on-top" detail is the incorporation of the four safety valve columns, which are, as it were, "sunk" in a recess at the front of the cab roof. Mechanical lubricators, sand-box fillers and stays and similar items along the running plate above the driving wheels also are well shown, while the girder framing from which the expansion link in the valve motion of the real engine is suspended is also clearly marked. Its location has been very carefully arranged so that the dummy link on the Hornby-Dublo *City of London* really does appear to be pivoted at the correct point.

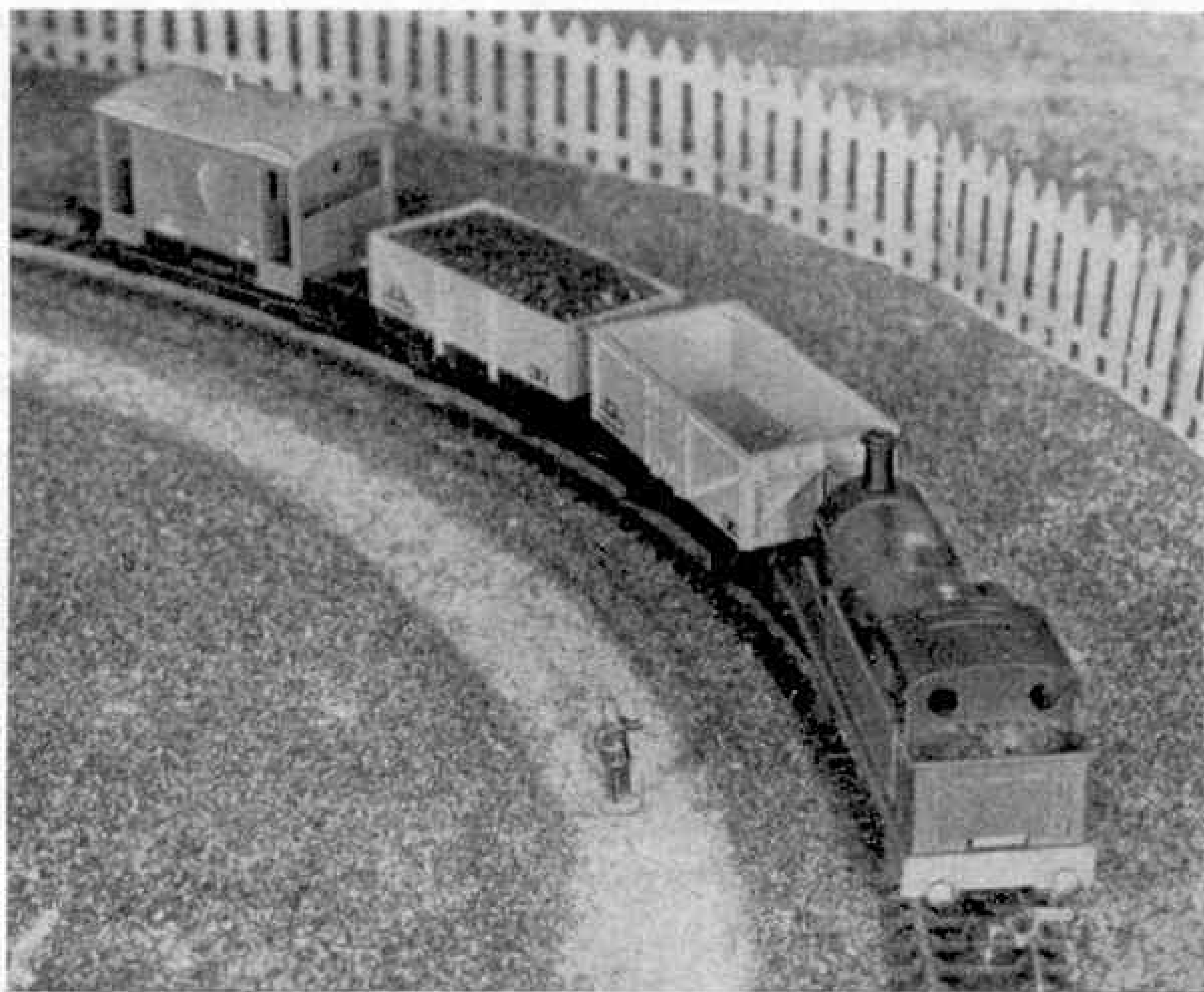
The chimney, of characteristic double form with twin exhaust outlets, is a

The Hornby-Dublo 0-6-0 Tank, running bunker first, brings a short train along a single-line branch.

separate casting, and particular care has been taken to obtain a convincing outline. The top-feed casing and pipes, boiler hands, dome casing, fire-box inspection plugs and the whistle—all are there, and so are the recesses formed in the boiler casing that on the real engine allow the lids of the mechanical lubricators to be opened.

The tender body is another departure, as it is of moulded form with a considerable amount of detail included. Items such as the well-trimmed load of coal, the division plates, tank filler and vents and pick-up dome all help to make the model convincing when it is looked at from above, as so often is the case with model railways. On the rear of the tender tank, lamp brackets and steps are represented and there is even an almost microscopical reproduction of the plate carried by the real tender incorporating the letters L.M.S., which as you know stands for London Midland and Scottish.

Details at the front of the tender, on the footplate so to speak, are amazingly good, the coal doors giving access to the tender

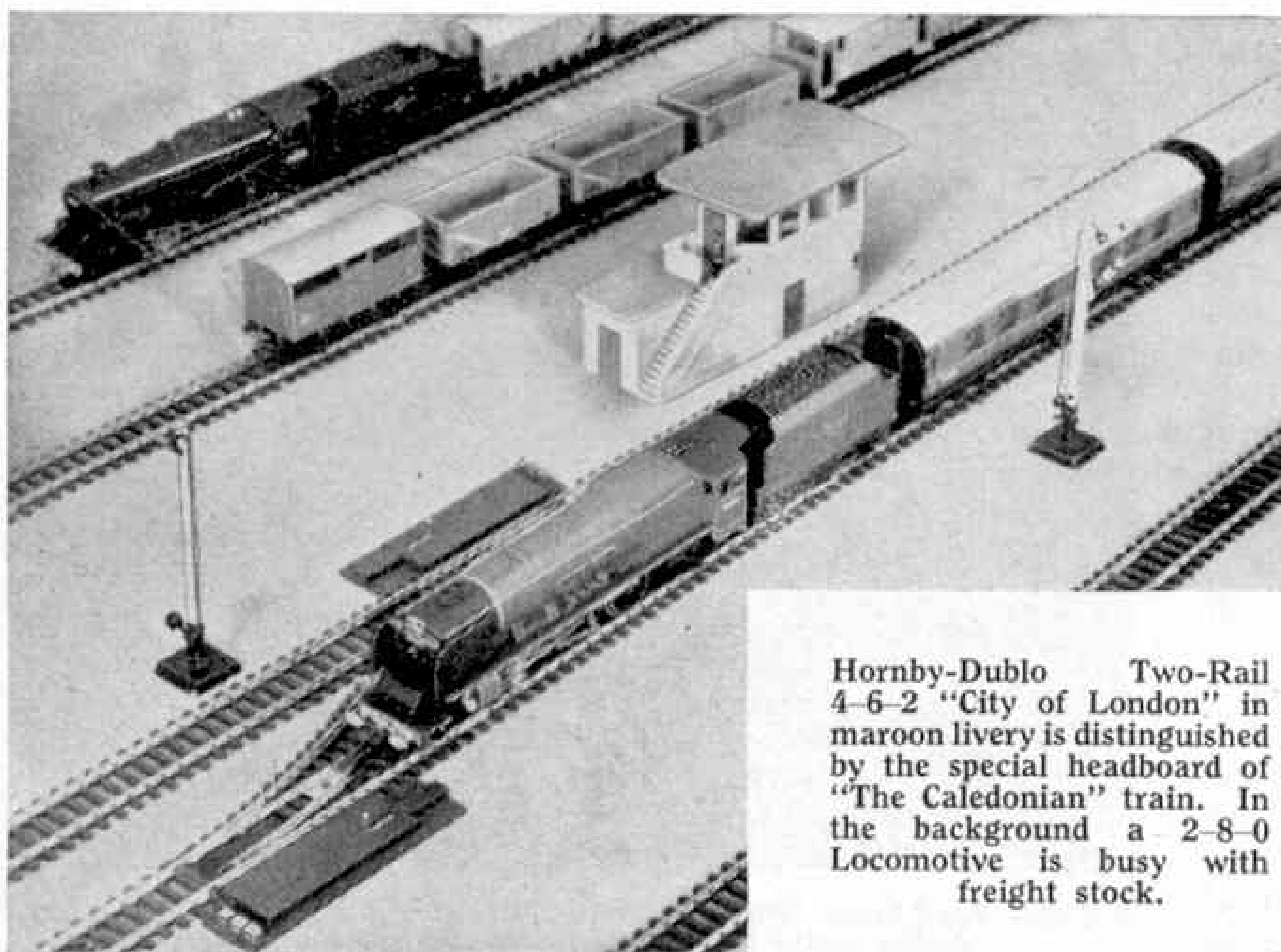


interior, and the shovelling plate, water scoop and hand brake handles as well as the water feed handles all being represented. Even the water level indicator, which on the real thing stands above the tank where the fireman can see it when he is operating the "dip" handle, has not been forgotten.

So much for the "looks". Now what about the "works"? Here we must point out although the basic Hornby-Dublo mechanism with vertical armature shaft familiar for so long is incorporated, the motor frame casting is entirely new and is suited to *City of London* only. It could not be fitted into a *Duchess of Montrose*

as the method of fixing is quite different. I mention this particularly because I have had very many enquiries from Hornby-Dublo owners on this point.

When you remove the motor frame unit from the housing for inspection, cleaning or lubrication, you will notice that the top bearing of the armature shaft is of the self-oiling type. This needs no special attention to lubrication except at very long intervals, say perhaps twice a year.



Hornby-Dublo Two-Rail 4-6-2 "City of London" in maroon livery is distinguished by the special headboard of "The Caledonian" train. In the background a 2-8-0 Locomotive is busy with freight stock.



Shed staff on Hornby-Dublo railway help to prepare "Duchess of Montrose" for duty. The Water Crane at the line-side is a simple, but effective, feature.

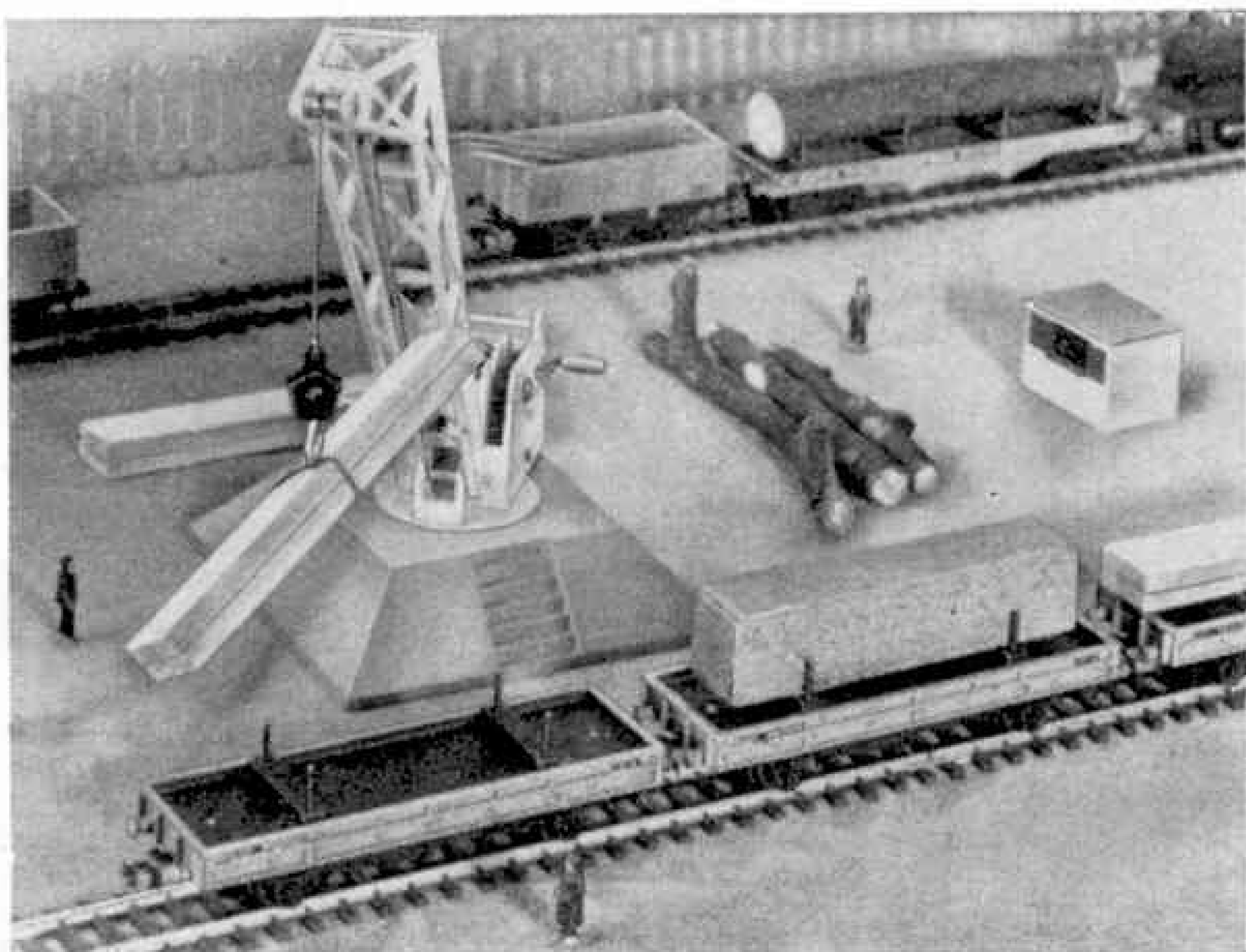
About Cranes and Other Things

By "The Engineer"

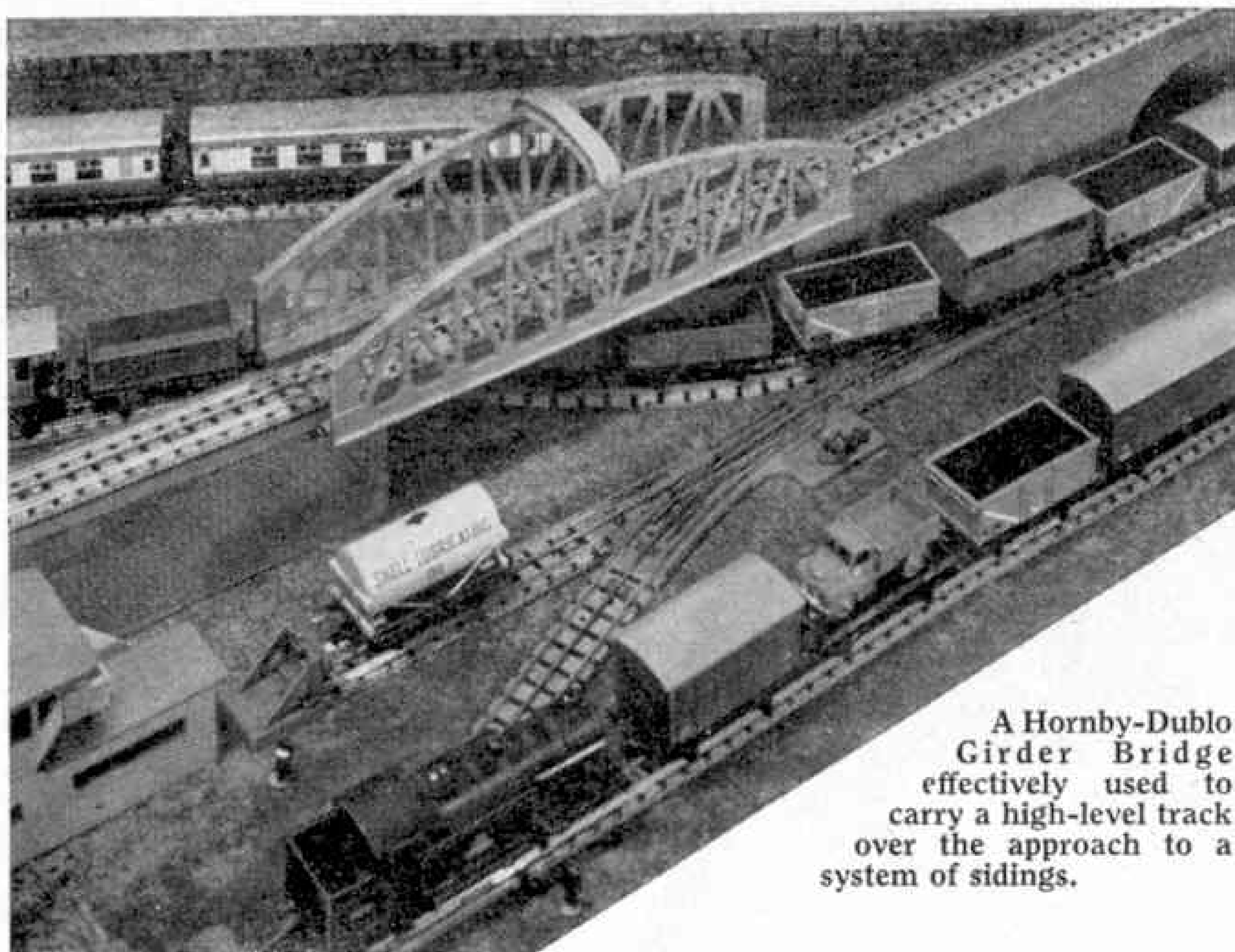
THE picture above follows up one or two of the schemes that I mentioned last month, as it shows a Hornby-Dublo *Duchess of Montrose* being attended to by shed staff. The Water Crane by it is essential on engine shed layouts, and quite suitable for placing at platform ends and in yards, anywhere in fact where engines are liable to stand. Sometimes I have seen Water Cranes rather unhappily placed on layouts, so this is a point that you might bear in mind. On permanent layouts lineside items of this kind can become quite dusty and this does not look good. From time to time the careful owner goes cleaning up here and there and, in the case of the Water Crane, making sure that the swivelling arm at the top of the column lies correctly parallel with the track.

I wonder how many of you have tried the scheme illustrated on these pages some years ago of cutting short the flexible pipe or "bag", as enginemen call it, so that it just fits over the tank of a locomotive, which can thus appear to take water? I have noticed in several places that this very thing has been done in actual practice, apparently in order

This particular Department of a real railway looks after other types of cranes as well, in particular those located in goods yards and elsewhere for handling an amazing variety of bulky or heavy items carried by rail. In the Dinky Supertoys range we have a very effective Goods Yard Crane, No. 973. This is really intended for Hornby Gauge 0 purposes, but it is not unreasonable to use it in Hornby-Dublo as cranes vary in size and capacity—and it is a nice model anyway. It is actually



A Goods Yard Crane (Dinky Supertoys No. 973) is being used here to load timber on the Hornby-Dublo Double Bolster Wagon.



A Hornby-Dublo Girder Bridge effectively used to carry a high-level track over the approach to a system of sidings.

employed by very many Hornby-Dublo owners.

In the lower illustration on the opposite page this fine Crane is slinging a load of timber, ready for placing neatly on the bolsters of the long-wheelbase Double Bolster Wagon nearby. This load, by the way, consists of the miniature timbers that are now provided as standard with the Double Bolster Wagon.

Crane driving in miniature is quite good fun and it can be developed to a really fine art. A Hornby-Dublo operator skilled at this sort of thing can thoroughly enjoy himself with his Crane. Its working is reliable and efficient if care is taken to keep the various moving parts of this item in good order, to see that the hoisting and derricking "ropes" are not allowed to get tangled up, and so on. Nothing much can go wrong mechanically with this stout Supertoy, as I am sure that those of you who have used it will agree.

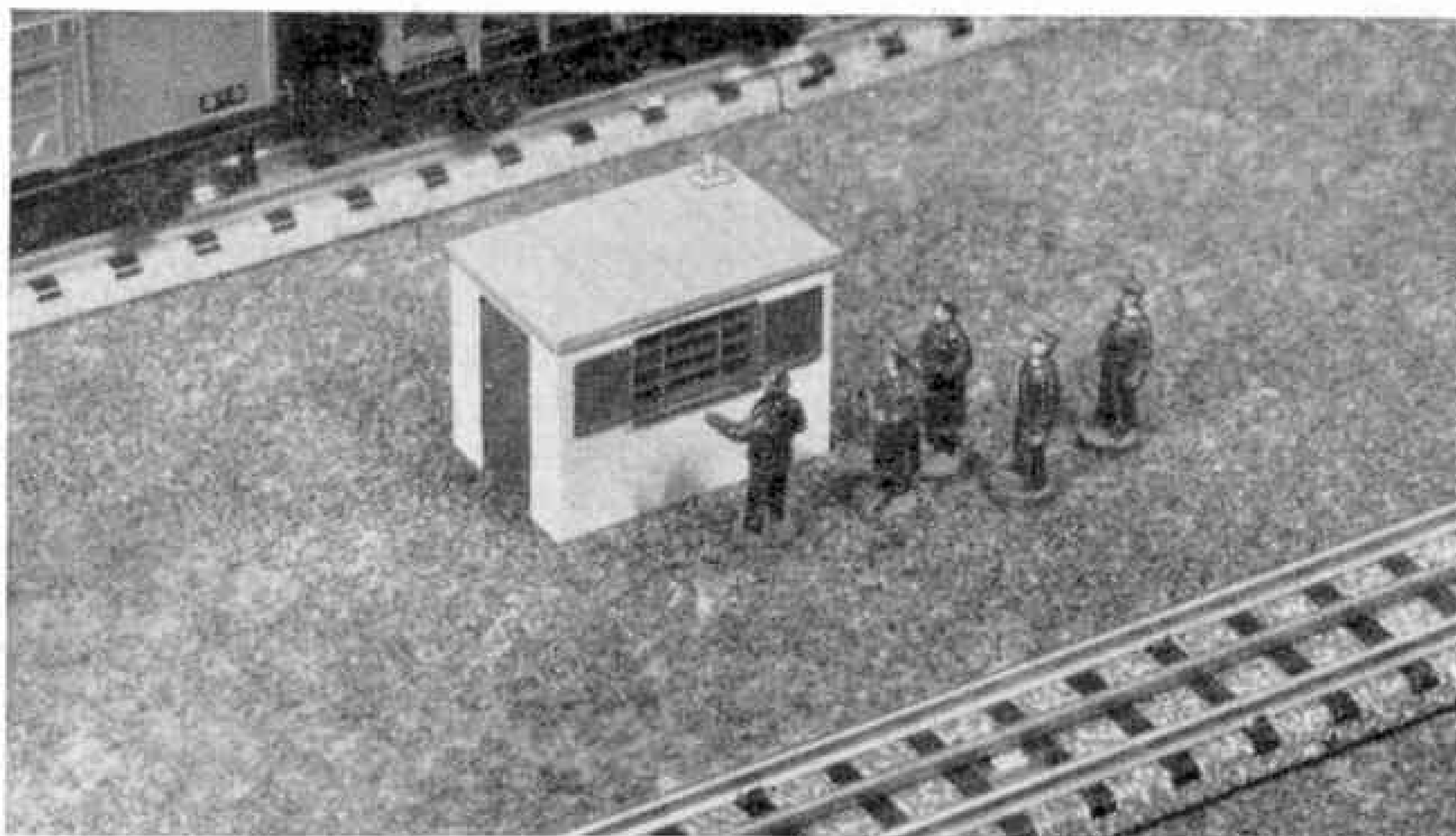
The Hornby-Dublo Girder Bridge, in the next picture, is not a working item, but it does play an important part on many Hornby-Dublo layouts, and in any case the Bridge and its approaches come under the survey of the Chief Engineer. There

is no need for me to tell you a great deal about it, but in track planning it is useful to remember that it accommodates a single line of track and corresponds in length to the standard Straight Rail of the Three-Rail system.

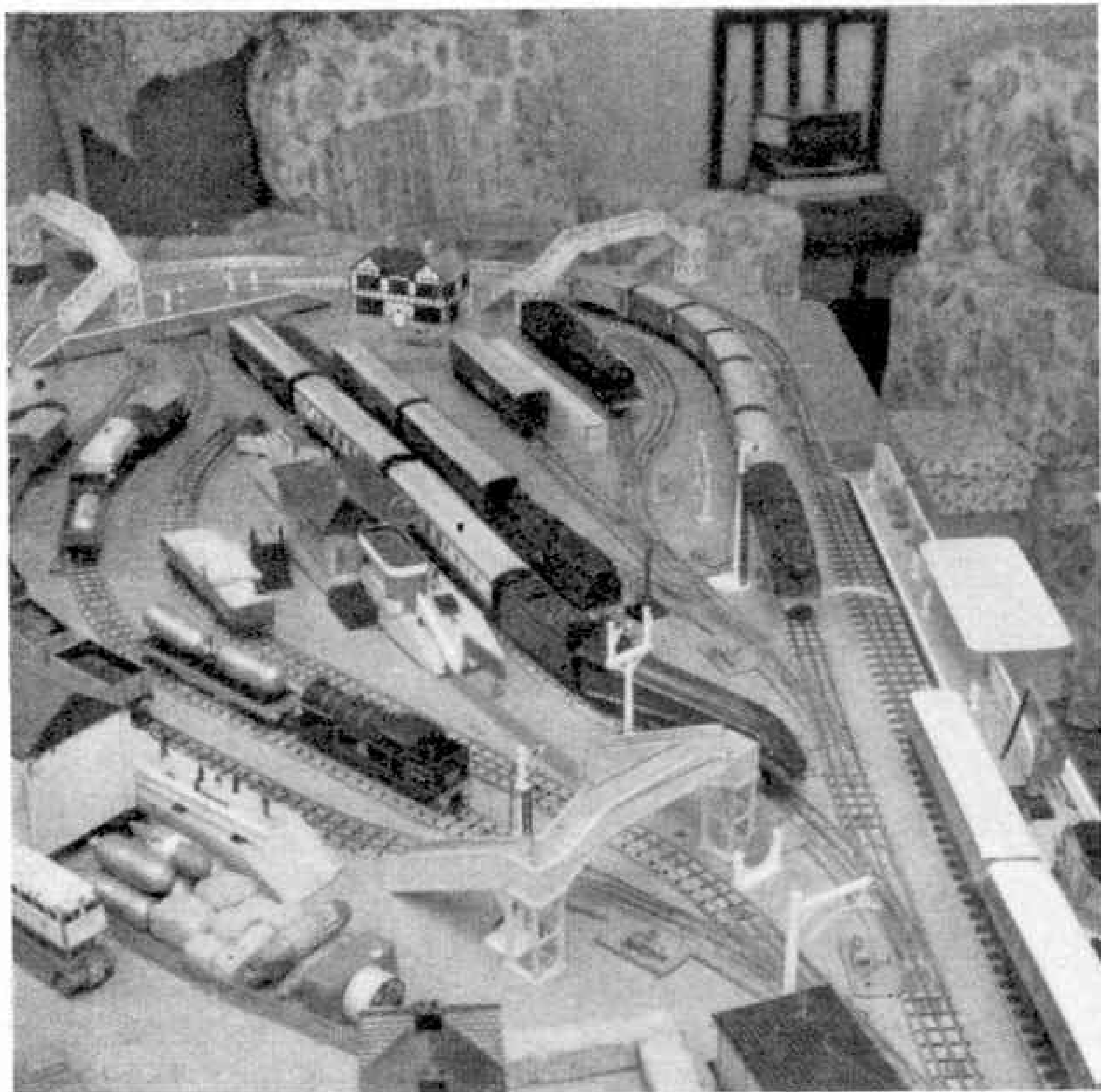
The raised approach sections shown in the illustration are actually of solid timber and formed part of a Hornby-Dublo exhibition layout some time ago. It would be quite possible to obtain a similar effect by the use of blocks spaced

at intervals supporting the raised base, over which the elevated track is run, the sides of the resulting structure being filled in by means of plywood, hardboard or even card. The sides can be finished by painting, or by the use of the printed brickpapers obtainable at many model railway shops.

Many of you no doubt find useful suggestions for extending your layouts, or adding to their interest, in these pages. But I am sure you have other problems, or will have, and shall be glad at any time to give advice or information that will be helpful. So send along your enquiries, but when you do *please remember to tell me whether your layouts are two-rail or three-rail*. This will make it easier for me to help with as little delay as possible.



Pay day! Hornby-Dublo railwaymen form a queue outside the "pay hut", an effective alternative use for the well-known Platelayers' Hut.



Part of the Hornby-Dublo layout jointly operated by J. Hardy and J. and C. Miles, that is described here. The curved sidings referred to in the article are clearly shown.

ALTHOUGH the Hornby-Dublo Two-Rail system is becoming well established and numerous systems are in course of development the bulk of the details that enthusiasts send to me still concern Hornby-Dublo Three-Rail systems. This is understandable because in most cases photographs are taken on a layout when the line has been in course of development for a considerable time, sometimes several years. It is only to be expected therefore that we shall continue to deal with Three-Rail systems in our talks, although naturally attention will be given to Two-Rail layouts when we have some good readers' pictures to show you that are likely to interest all.

Some time ago I received details of an interesting Hornby-Dublo layout that is jointly operated by three enthusiasts, respectively J. Hardy and J. and C. Miles, of Fordingbridge, and that is the layout of which you see part in the illustration above. It has points of difference from what we may consider the average layout. For instance, the outer main tracks, although having the appearance of double track, are actually operated quite independently and in fact, at one end of the system, one track is carried over the other by means of the

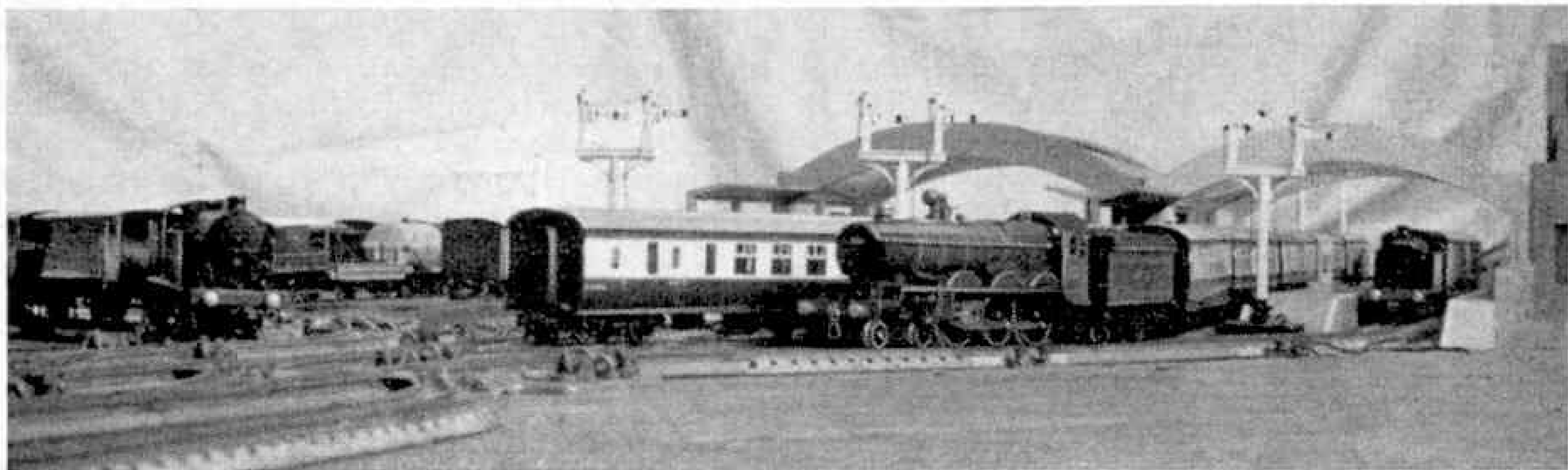
A Joint Layout, and Some Others

By
"Layout Man"

Hornby-Dublo Girder Bridge. This separate method of working has its advantages, more particularly where there are several operators involved, each of whom is keen to have an active share in the working.

Control arrangements are therefore extensive, there being a separate power unit to each of the running tracks, while the internal sidings are split into two groups from the control point of view, each group with its own power unit. There are of course appropriate insulating gaps at strategic points to divide the main sections electrically.

Another unusual feature is the fact that although in the illustration here there appears to be one station serving the outer track and another within the main oval, these are regarded as one complete station, well spread out in order to provide for terminal working and through running. The general aspect of the system, except for the fly-over section, will be apparent from the illustration and you will see that extensive use has been made of Curved Rails in the various sidings, possibly because the railway began by combining the original Train Sets owned by each member of the group, with a consequent accumulation of Curved Rails. The sidings have quite a reasonable appearance although they do not follow the usual straight lines, and they are finished off by a Buffer Stop on each road.



A realistic ground-level view of the station on the Hornby-Dublo layout of R. M. Bell. "Bristol Castle" is leaving the station with a train, while two 0-6-2 Tanks are engaged on freight duties.

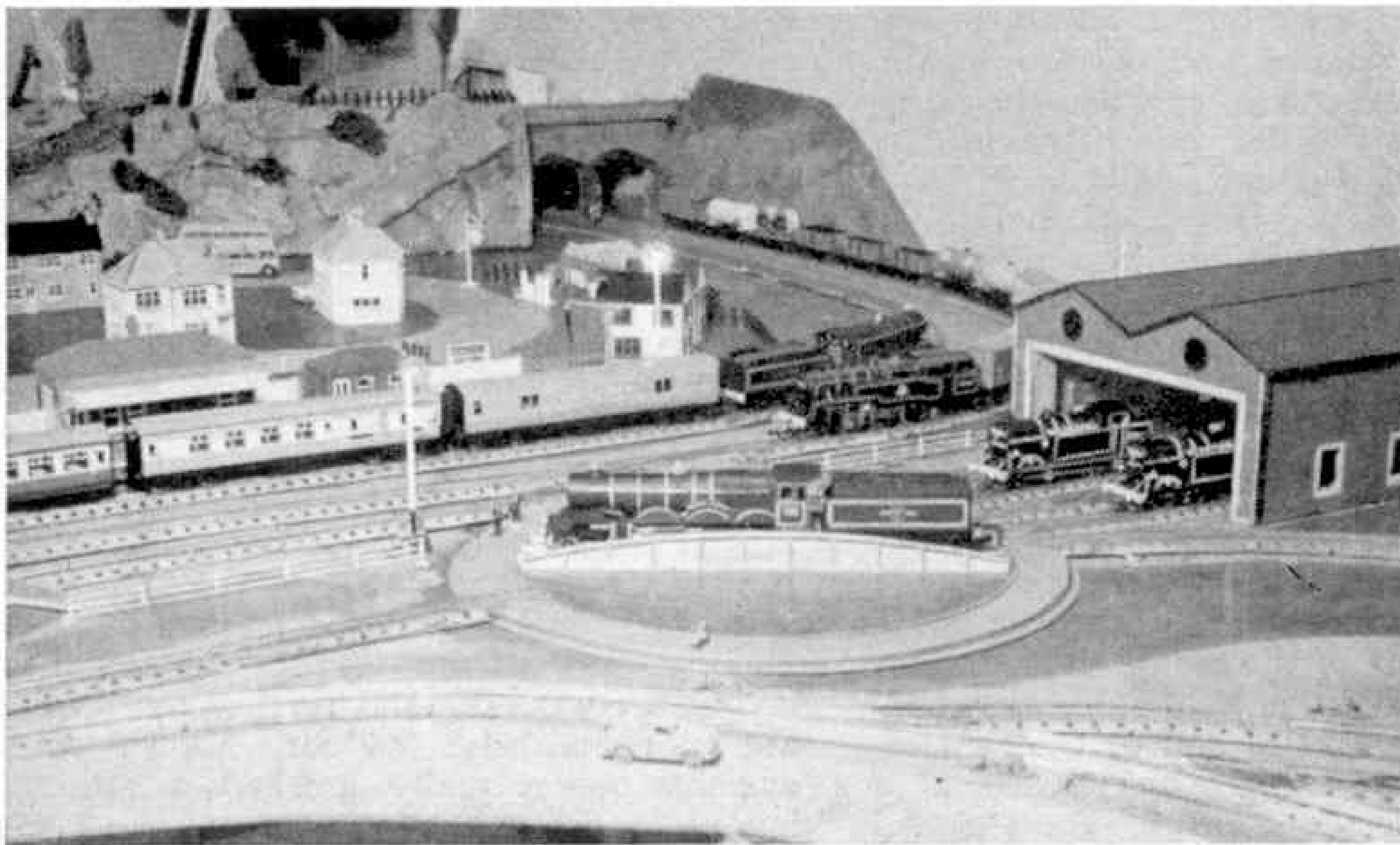
No doubt the railway has developed considerably since our friends forwarded their description, but at the time of writing there were eight passenger coaches of various kinds and eighteen goods vehicles to deal with traffic. Motive power amounted to five Hornby-Dublo locomotives, including a streamlined A4 4-6-2 tender Locomotive, a 4-6-0 *Bristol Castle*, two 2-6-4 Tanks and one 0-6-2 Tank. Each of these engines can be picked out in the illustration.

You will see that lineside effects have been by no means neglected, signals, bridges and various buildings of railway character and otherwise being visible. A feature is made of the transport of actual loads, some of these being made up or adapted at home.

A layout that is a joint one in another sense is that shown in the upper illustration on this page, where you can see the fine main station on the Hornby-Dublo system of R. M. Bell, of Groombridge. I describe it as a joint system because it includes W.R.

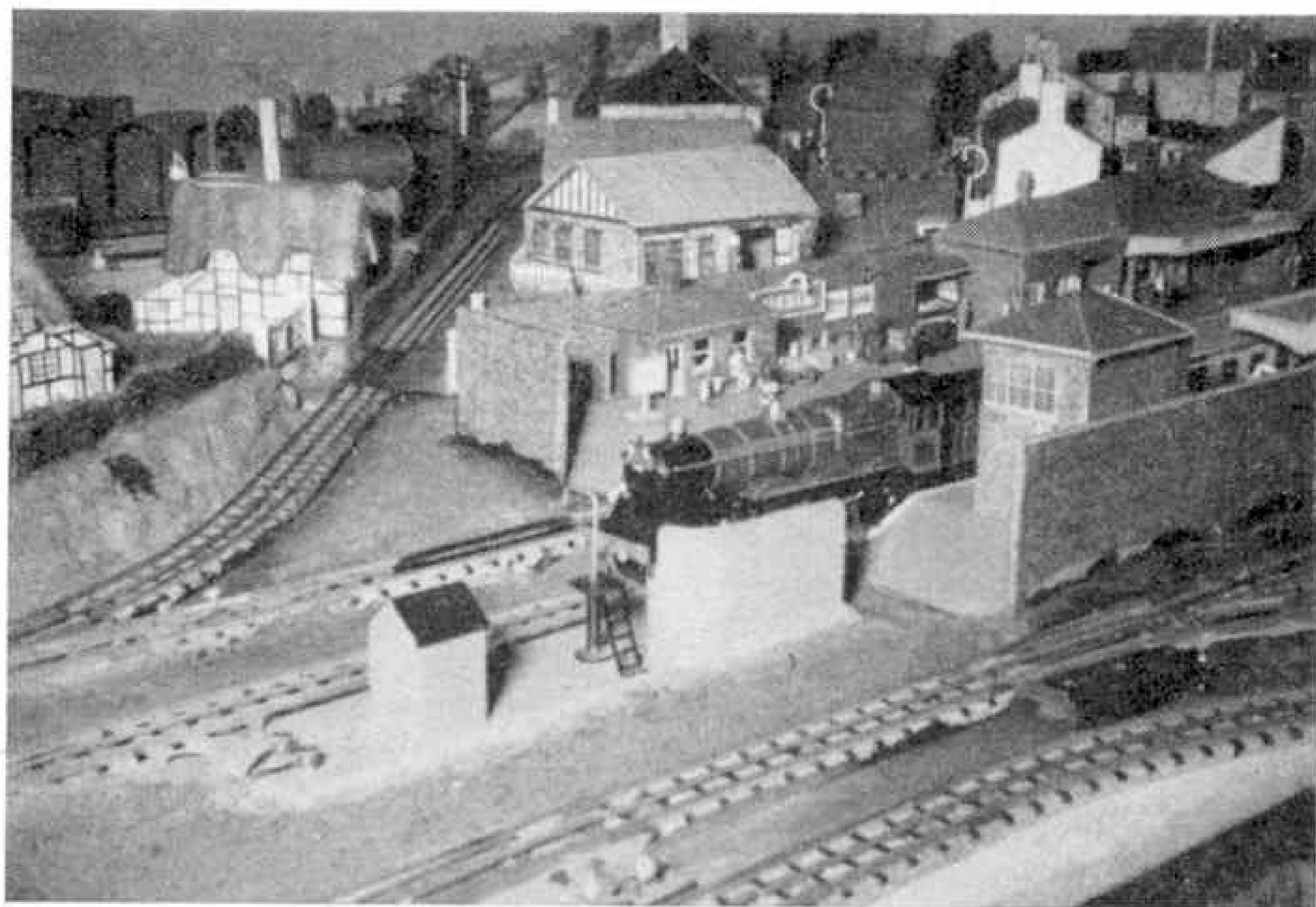
and L.M.R. locomotives and rolling stock and for this reason the station shown in the picture reminds me somewhat of Shrewsbury, where Crewe 4-6-2s and Swindon 4-6-0s can be seen alongside one another at times. Just the same sort of thing can happen on this Hornby-Dublo layout as a Duchess and a Castle are included in the engines working on the line.

Now we cross the Border to a layout developed by a Scottish enthusiast, E. Dicerbo, of Moffat, whose layout involves some 200 ft. of track and more than twenty sets of Points. This is another layout incorporating a high-level section, but this was added after the view shown in the lower illustration here was photographed. The raised section, crossing the baseboard tracks at two places, provides for continuous running and there is in addition a short branch at this higher level serving a small terminal station known as *Overton*. Stations on the main line include *Crawford*, while the one shown in the illustration below is known as *Jockstoun*.



A view of "Jockstoun" station and engine shed on the layout of E. Dicerbo. The Hornby-Dublo Turntable is prominent in the foreground.

A special feature is made of lineside effects and many of these have been built up and arranged by the owner. The layout is extensive so that really good running can be enjoyed, and the lengths of straight track available enable the engines to show their paces in a very satisfactory manner. The principal express trains are handled by Castle locomotives and there are two 0-6-2 Tanks and one 2-6-4 Tank as well. The passenger vehicles permit a representative train to be assembled, including the T.P.O. Mail Van that you see next to the



A Hornby-Dublo Castle hauls a train past the station and T.P.O. Lineside Apparatus on the layout operated by Mr. J. Vinter, and his son. The outer main tracks curve away to the right, while the single line reverse loop branches off in a realistic manner.

Castle locomotive in the station. Long goods trains are readily run, generally by the Tank locomotives, and no doubt the 25 goods vehicles available when the notes were received from our enthusiastic correspondent have been added to by now.

Finally, we see on this page one end of the station that forms an important part of the layout operated by Mr. J. Vinter, of Louth, and his son. The railway began as the result of a Christmas present some years ago, and it is not surprising that, once begun, rapid progress was made. The layout itself consists of a double track main line arranged more or less in what I might call "pistol" shape, the two tracks curving away to the right of the picture forming part of the butt of the pistol. The station is situated on an inner loop of double track that runs from end to end of the system. Branching away across the board is a single-line reverse loop providing useful

train working facilities as well as giving an opportunity of including the Level Crossing that you see a little way up the line. The complete layout is 10 ft. long and the width at the broader end is 8 ft.

There has therefore been plenty of opportunity of incorporating some scenic details and full advantage has been taken of this. Some of the buildings have been made from kits, etc., but the embankment, fields and tunnels have been made from raw material including a quick-setting plaster of the type used for filling holes in walls. To

quote Mr. Vinter's notes: "This was spread thinly over the wood and hardboard framework, then left to set, which I might add needs only a few hours. Work can then begin again by using various shades of green paint and touches of yellow for fields, etc. When this had been done, while the paint was still wet, sawdust was scattered freely on and brushed about and then left to dry. Any loose sawdust was then removed by the invaluable assistance of

mother's vacuum cleaner, resulting in a satisfactory, finished appearance.

"Hedges, which are necessary on layouts, were home-made from foam rubber off-cuts obtainable from hardware stores. These pieces were then cut into lengths, with the tops trimmed in zig-zag fashion, and the whole painted dark green. The finished sections were then cemented on the layout baseboard. Lineside shrubs are merely natural moss, cut and stuck down in place. Up to the present this has retained its natural colour well."

With the 2-6-4 Tank, Bo-Bo Diesel and *Bristol Castle* added, together with other Hornby-Dublo items such as the Mail Van Set, Turntable, Electrically-Operated Signals and Colour Light Signals, the layout is complete. But further extensions are not unlikely; as Mr. Vinter says one has never really finished a railway layout.

From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

The Lion of Alfriston

The visitor to the charming village of Alfriston, in Sussex, may wonder what is the meaning of the somewhat fearsome monster outside the old Star Inn. The inn was in old days a resting place for pilgrims and mendicant friars and a sanctuary for persons fleeing from justice, but the red lion with wild staring eyes is the figure-head of a Dutch vessel wrecked in Cuckmere Haven in the year 1672.

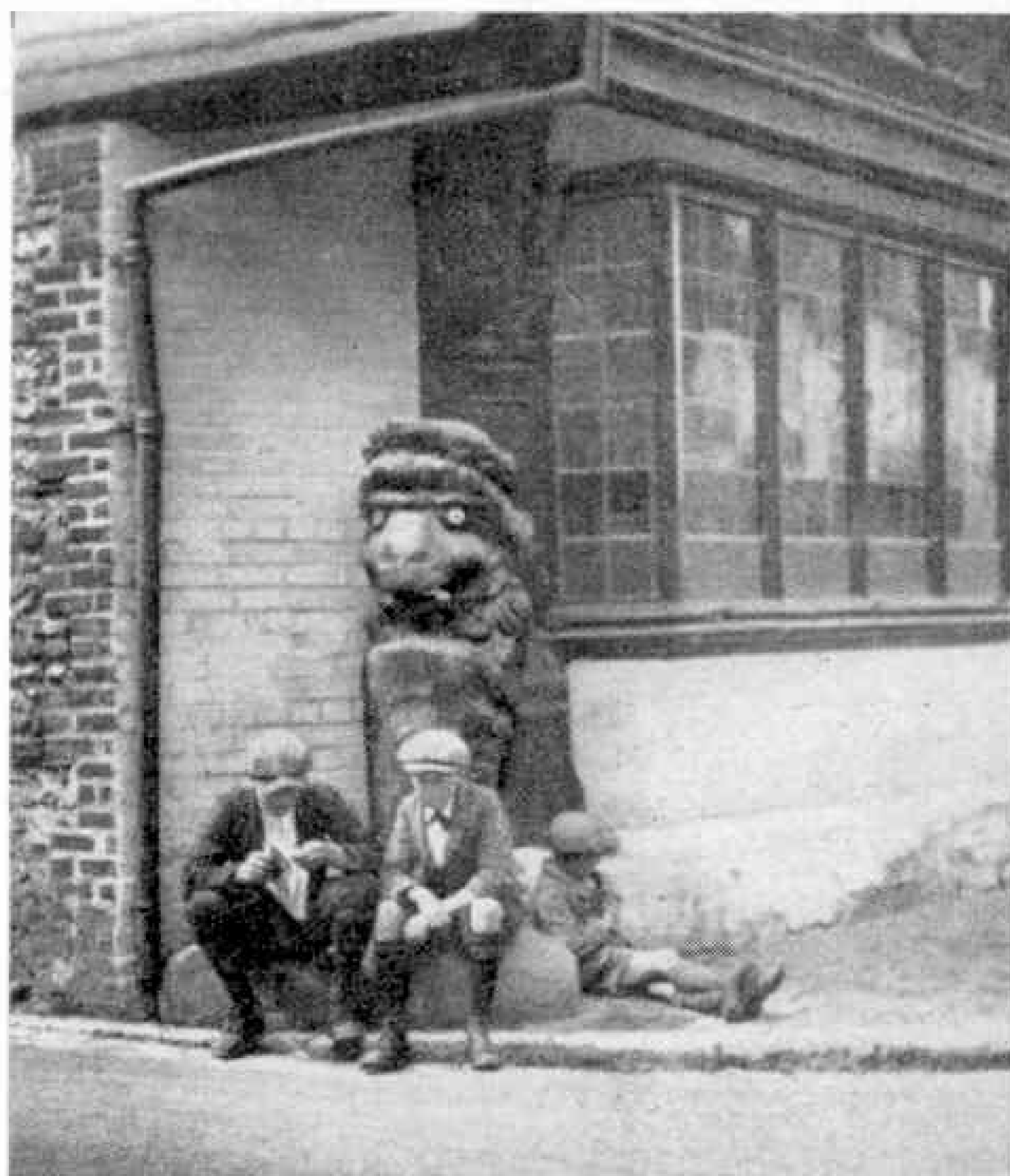
In a naval battle nearly 300 years ago, between Dutch and English fleets in Southwold Bay, south of Lowestoft, one of Admiral de Ruyter's men-of-war was seriously damaged and drifted helplessly down the east coast and along the Channel. There it was driven ashore in Cuckmere Haven by a severe gale and broken to pieces by the pounding of the waves. The enterprising landlord of the Star saved this figure-head and set it up where it stands today.

A. PHILLIPS (Eastbourne)

Notable Milestone

The famous series of "Bow Bells" milestones on the London-Eastbourne road will be familiar to many readers. They are not made of stone at all, but of solid cast iron. They are in fact

One of the famous "Bow Bells" Milestones, the story of which is told on this page. Photograph by Frank Bunce, London.



The Lion of Alfriston, which came from Holland! Photograph by A. Phillips, Eastbourne.

a relic of the now defunct Sussex iron industry. This was discovered in 1940, when by Government order all milestones

of possible assistance to enemy agents were uprooted and stored away for the duration of hostilities.

The posts are not all 200 years old, as is commonly believed. The Highways Department of the East Sussex County Council found that the series of Bow Bells "stones" was incomplete. They thereupon had the missing posts recast, identical in all respects to the missing ones, and placed in their respective positions. Only an expert can tell the difference between the old ones and the replacements.

The series was completed about a year ago, and now ranges from the Sussex-Surrey border in the north to within a very few miles of the coast. The one seen in the accompanying illustration is outside the village post office at Forest Row, near East Grinstead.

F. BUNCE (London)



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Stamp Collectors' Corner

By F. E. Metcalfe

SPECIAL ISSUES

Collectors who have not perhaps given the question proper consideration often complain that British Commonwealth countries issue such a lot of stamps. They overlook the fact that many countries are concerned, and indeed no countries are as conservative as our own when it comes to the question of issuing special stamps, to commemorate this, that and the other event.

Nevertheless, and quite uniquely, four Commonwealth countries did issue short sets during last December and January. Out of sixty, four is still not many, seeing that there will be few others following suit for some time to come. It is about these very interesting new issues that I am writing this month, for all the stamps concerned are really attractive and there are very worth while objects behind their release.

The first country in the quartette was Basutoland, where three stamps were issued on 15th December to mark the 75th anniversary of the founding of the present Protectorate. Maybe those who understand impressionist art—if there is anybody—would not be particularly enchanted with the designs, but they do tell their stories in a manner that all can understand.

First of all, the 3d. value shows Chief Moshoeshoe, who it is claimed promulgated the first written laws of the country which are known as the Four Laws of Moshoesh. The 1/- stamp depicts the octagonal Basutoland Council Chamber, built in 1910. Here laws are proclaimed, the traditional method being a gathering of chiefs and people into what they call a "pitso", where any member of the audience can voice an opinion. This Council Chamber will continue to be used for the Basutoland National Council.



The third and final value of the set, the 1/3, shows a horseman, who is said to be a typical Mosotho, receiving the benefit of peace, represented on the stamps by a dove, ears of sorghum, representing plants, etc. Incidentally, the word Lesotho, to be found at the top of each stamp, is the Sotho (native) title for Basutoland. Altogether the set is one well worth buying, particularly as it will only cost a little over face while current. This indeed

is the case with all sets I am going to mention this time.

The next special issue on our list appeared on 1st January. St. Lucia, the West Indian colony, was



the country concerned, and while there is only one design for the three stamps, of values 8c, 10c and 25c, it is such a really handsome affair that the issue is meeting with deserved popularity. The ship depicted on the stamps

denotes the supposed discovery by Christopher Columbus in the sixteenth century. In the background can be seen the two conically shaped mountains, known as the "Pitons", that have appeared also on other St. Lucia stamps. The island was supposed to have been discovered in 1502, and many were the battles fought between Britain and France before we obtained full possession. Of the four sets, this is the one I prefer, probably because like many other people I do love the sight of one of these old, old ships.

Now back to South Africa, for a near neighbour of Basutoland, Bechuanaland. This territory is also celebrating its 75th anniversary, with a stamp issue of three values, and it must be admitted that the designs are rather shockers. Incidentally, this is the only set not recess printed. It is in photogravure, and somebody presumably has had an eye on the cost. Not a very wise economy really, when you consider that a big percentage of the issue will be sold to collectors at a net profit of about 99 per cent. As in the case of St. Lucia, there is only one design. This shows what is known locally as a "Pan", a typical feature of Bechuanaland, we are assured, where a shallow, or nearly dry lake, provides water for livestock. Flanking the "Pan" are portraits of Queen Victoria and Queen Elizabeth.

The values are 3d., 6d., and 1/-.

And now for the final set, the one that with its airy fairy designs will no



doubt prove the most popular. Again we only have three stamps, but each has a different design. First the 2d., which depicts a Britannia air liner flying over an 1860 packet boat, and I had better say before I go any further that this set has been issued to commemorate the centenary of the setting up of Jamaica's separate postal service. Back to the designs, the 6d. shows a mule cart for the internal conveyance of mails during the Victorian period on one side of the Queen's portrait, and a modern motor mail-van on the other. On the top value, the 1/-, we get attractive illustrations of the current 1/- stamp and the first of that value issued by Jamaica. A happy thought, as the new stamp is of 1/- value.

Well, there are the four recent commemorative Commonwealth issues, but I want them not only to adorn my story, for I am going to suggest that they are all worth buying now while they are current, and also that other special issues of the present and the previous reign are worth taking up.

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For other Stamp Advertisements see also pages 156 and xxii

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Stamp Gossip

ARRIBA ESPANA

A reader has asked me if I have noticed what beautiful stamps Spain is issuing today. I certainly have, and do not refer to them as often as I should like, simply because so many countries also issue beautiful stamps, and I haven't room for all of them.

This month I am asking the Editor to illustrate one of a Spanish set issued on 24th October last to commemorate the 1659 Peace of the Pyrenees,

signed between Philip IV of Spain and Louis XIV of France, to end a war that had lasted 25 years. The design shows the two kings shaking hands, and reproduces part of a tapestry found in Versailles. The set is a delight.

SIMPLICITY

After the elaborate design of the Spanish stamps, let us have a look at an air stamp from Chile that is simplicity itself, and yet most attractive. Incidentally, both the Spanish and this Chilean stamp have been designed and printed in government printing works, so whatever else

such departments cannot do, they can at least produce "good-to-look-at" stamps, to use a term employed by an American reader in a letter about his own country's issues.

I suppose it is the Andes that are depicted in the left bottom corner, but who knows the type of plane shown? I saw the Andes, or rather part of them, several times and will never forget the first view. From the Argentine city of Mendoza, with a loose weekend on hand, I decided to take the train up to an hotel and stay there until the Monday. I came out of the hotel, which was a few thousand feet up, and had a look round. All seemed rather ordinary, because clouds were low lying. And then the clouds parted for a few moments and the tops of one or two high peaks were revealed. Never will I forget that sight. I cannot attempt to describe it.

MOUNTING

Many collectors take great pains to see that all the stamps they buy are nicely centered, and arrange their album pages with care; yet when they come to sell their collection they are often surprised when the dealer, after flicking up one or two of the stamps, gently but firmly hands it back and will not even make an offer. You wonder why?

The answer lies in those few flicking motions



with which the dealer was turning up the stamps. He had learned the hard way to avoid buying stamps that had not been properly mounted, for even if they were not stuck down, a horrible piece of stamp mount might remain on the backs of the stamps, and collectors nowadays simply will not have them that way.

So do please take the greatest care to buy only the best stamp mounts—they are still cheap at about 1/6 per thousand—and if you have bought those that are not already doubled, only double back about a quarter of the mount. To this small portion, which is stuck on the stamp, apply only the least moisture possible. This is very important, for any surplus moisture has a habit of getting on to the gum of the stamp outside the mount. This sticks the stamp to the album page, and bang go your mint stamps.

Apply only a mere suggestion of moisture to the part of the mount that holds the stamp in position too, and gently press it on to the album page.

DON'T WASTE WATER

We all remember with pleasure the fine summer we had last year, but although really only a few weeks of fine weather were concerned, some of the local authorities got very concerned about our water supplies, and in some places it had to be rationed.

Apparently Britain was not the only place feeling the shortage last year, as is shown by the pair of Mauritian stamps illustrated here, which I picked out of an office lot a few months ago. Quite an interesting cancellation, eh? But if Mauritius is like Britain at the time I write these lines, they will be wanting a slogan *Save us from water*.



SKYSCRAPERS

Central and South American countries are at least as go ahead as we are, and equally of course they are going in for skyscrapers. And they are proud of them, too, as can be seen from the Honduras stamp illustrated here. When we picture such countries in our mind's eye, I imagine that it is massive forests, mighty rivers, etc., that we visualize. That is how it is with me, for it is a good few years since I visited so many of them. How nice another trip would be, but would those big buildings appeal as did those of yesterday? I doubt it.

TIP OF THE MONTH

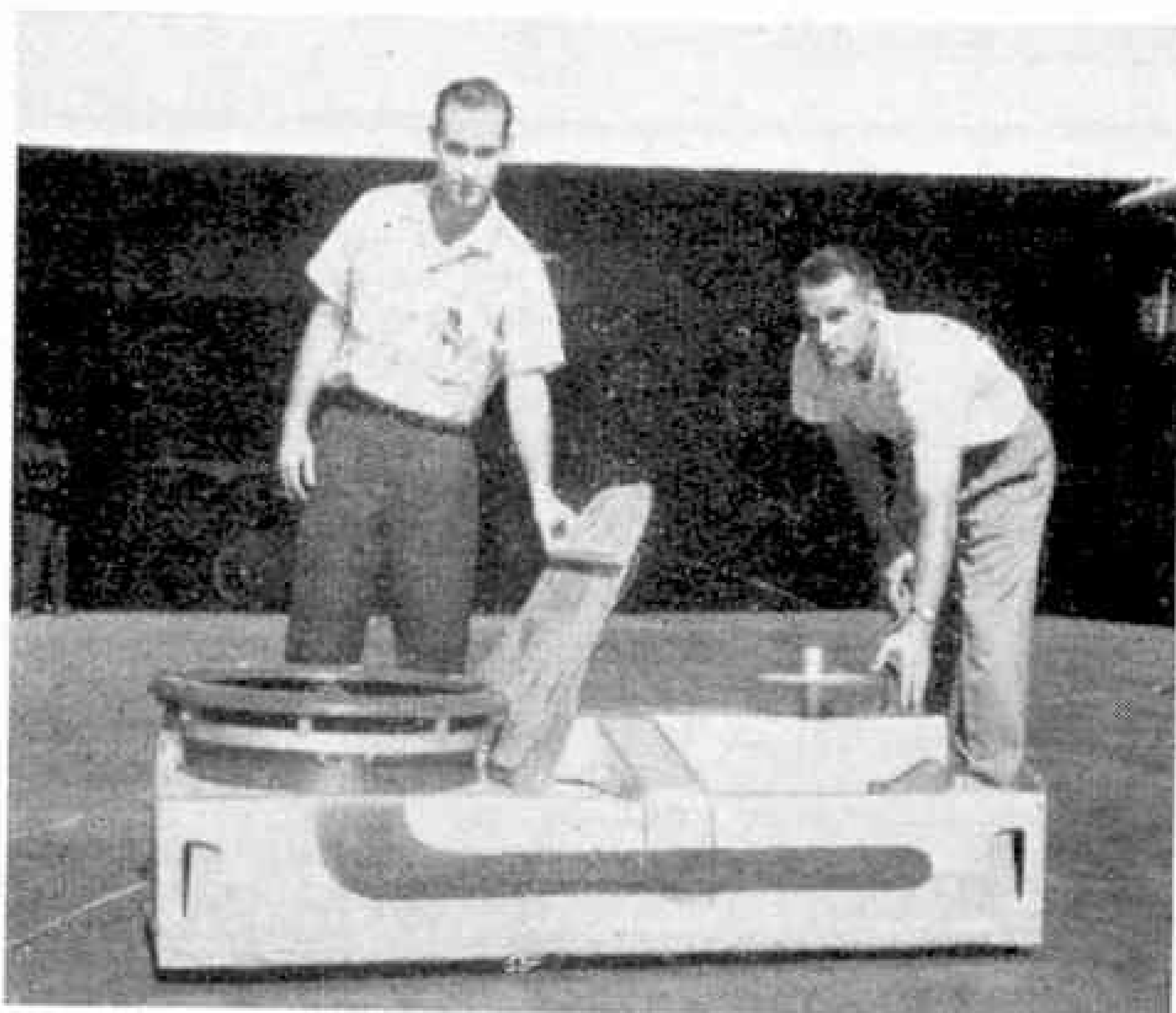
Ghana is issuing a lot of stamps in these days; they are colourful, yet the sales figures that have been published show that the quantities sold have not been

(Continued on page 160)

Space Notes—(Continued from page 119)

peanuts and other food can be handled and eaten even in the weightless state. Again monkeys will stuff themselves if provided with too much food at once and to overcome this gluttony, a special dispensing device has been made that dispenses one day's rations at a time.

Monkeys in test capsules, when bored, were found to take everything apart that they could find and to chew through cables. To deal with this problem a sealed system has been designed in which there is nothing for busy fingers to tamper with!



The Wernicke twins with the "Kiddie Kushion" described in the special article on Hovercraft on pages 128-130 of this issue. Ken, left, is over the ducted fan, and Rod is near the steering wheel which opens and closes directional ducts. Photograph by Howard Levy, New York, U.S.A.

Stamp Gossip (Continued from page 159)

too large. On the whole I would say they have a fairly bright future, in particular the "Football" set issued last October.

Even while current, a wholesaler told me that he could not obtain supplies of this set, which was available for only a few days. It is also true that most of the demand came when the stamps had been withdrawn. So if you like stamps on sport, and a great many do, I think you should consider this issue. I was surprised at the time that not more were sold, but that's a good thing for those who have a set.

"ABC U.S. MILITARY AIRCRAFT"

By JOHN W. R. TAYLOR
(Ian Allan, price 2/6)

Much has happened in the three years since the previous edition of this very useful booklet was issued. For instance, both the U.S. Air Force and the U.S. Navy now have in service fighter aircraft which exceed 1,000 m.p.h. as routine. This and other interesting developments are summarised by the Editor in his introductory notes, and are reflected in the technical data given in the booklet. As before, the types of current first-line combat aircraft are dealt with in alphabetical order according to make, and the material given in respect of each of these 40 aircraft includes dimensions, weight, type of power unit employed and, where permissible, details of armament. In each case a special paragraph summarises the service record of the aircraft.

Over 50 other types of current military aircraft are illustrated, and each is described in an accompanying note.

"MODEL RAILWAYS AS A PASTIME"

By GERALD POLLINGER
(Souvenir Press, price 15/-)

This well-illustrated book is primarily intended as a guide to those who are thinking of adopting one of the world's most popular and largest hobbies. It deals with practically all aspects of the model railway hobby in large, easy-to-read print. There are 136 pages of text spread over 19 chapters, with appendices. Each of the gauges is given its due share of attention and the range of subjects covers everything from the smallest indoor railways to large-scale outdoor systems. The text is not too detailed and is readily followed.

Model Railways as a Pastime is a most interesting and useful addition to the already large amount of literature on the subject and is recommended to all readers, whether they already have a railway or are thinking of starting one.

MIDLAND & GREAT NORTHERN JOINT RAILWAY PRESERVATION SOCIETY

A Society has been formed with the object of re-opening sections of the Midland & Great Northern Joint Railway, the greater part of which was closed early last year. The line formed the subject of an article in the *M.M.* for September 1959, under the title "Lost Railway!"

The organisation, known as the Midland & Great Northern Joint Railway Preservation Society, has issued an illustrated Prospectus and invites new members. It has arranged a Rail Tour over two lines not normally used for passenger traffic, to be held on Saturday, 21st May next. The train will be formed of ex-M. & G. N. or Great Eastern stock and will be hauled by an engine of the latter railway, probably a "Claud Hamilton" 4-4-0.

Readers who would like to take part are invited to communicate with Mr. B. C. Clark, 578 Eastern Avenue, Ilford, Essex. Fare for the tour will be about thirty shillings.

"ROSEBUD KITMASTER" PLASTIC SCALE MODELS

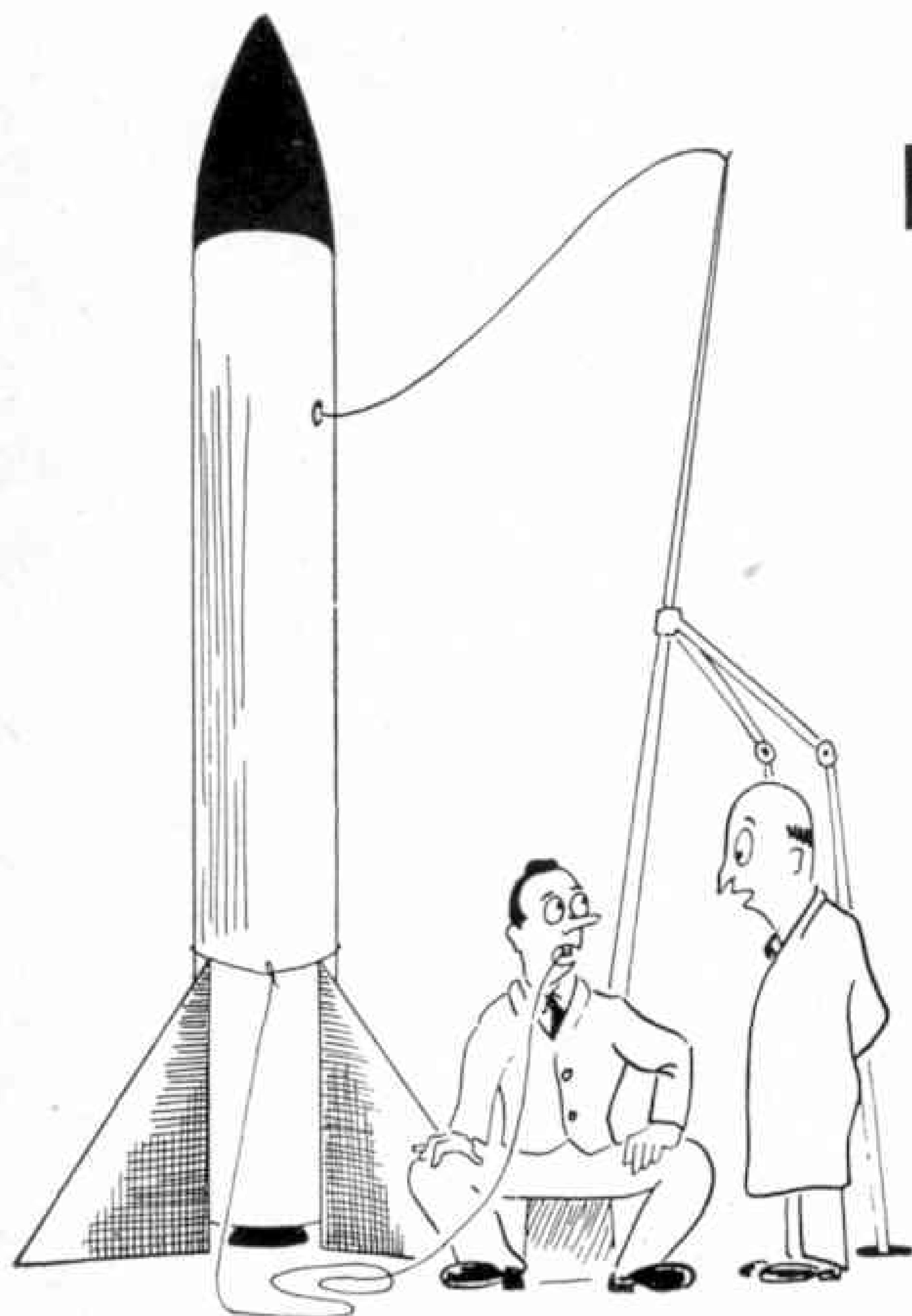
The assembly of models from kits of plastic parts is now a well-established pastime and the railway enthusiast is well catered for by the range of miniature locomotive kits of the "Kitmaster" series. The locomotives are designed to suit 00 gauge rails and the varied types offered share the same characteristics in that their moulded parts are ingeniously designed for ready assembly, well detailed, and they are extremely clean and so require the minimum of trimming.

An important feature of these kits is the carefully prepared assembly instructions, which also cover details for painting and general finishing off. The parts are moulded in one basic colour according to the engine represented and suitable transfers are included in each kit, together with a tube of special plastic cement, the careful use of which ensures success.

The kits are moderately priced, considering their scope, and they are readily obtainable.

"M.M." BINDING CASES

Copies of the Magazine are held in position by specially designed wires fitted on stout and well-secured leather thongs. The cover is in maroon. The binding cases comfortably hold twelve copies and single copies can be inserted as received. Price 9/6, post free. Write to *Meccano Magazine*, Binns Road, Liverpool 13, enclosing postal order.



Summerfield

"Now before I press the button—are you quite sure you wouldn't rather go to a dentist?"

Housewife: "I know you. You are one of those tramps I gave a meat pie to last summer."

Tramp: "You're right lady. You gave it to three of us. I am the sole survivor."

Man: (just acquitted on burglary charge, to his Counsel)—"Well, goodbye Sir, I will drop in on you sometime."

Counsel: "All right, but please make it in the daytime."

Doctor: "Your throat is very bad. Have you tried gargling with salt water?"

Sailor: "Well, I've been torpedoed six times."

Patient: "Doctor, you sure kept your promise when you said you'd have me walking again in a month."

Doctor: "Well, well, that's fine."

Patient: "I don't know. I had to sell my car to pay your bill."

A young girl on her first fishing trip was working busily over her line. Finally her father asked her what she was doing.

"I'm changing corks, dad," she answered sweetly. "This one keeps sinking."

A negro cook went into a bank with her wages cheque from her employer. As she could not write, she always endorsed her cheques with a cross. On this occasion she made a circle on the back of the cheque. "Why don't you make a cross as usual?" demanded the clerk. "Ah done got married yesterday, boss," came the reply, "and I've changed my name."

Fireside Fun

A professional dancer was explaining his act to a film producer. "You never saw anything so sensational. At the finish of our act I take my partner by the hair and whirl her around for exactly 20 spins. Then I wind up the whole thing by heaving her through an open window."

The producer stared aghast. "Heave her through an open window! Do you do that at every performance?"

The young man shrugged. "Well, sir, nobody's perfect," he admitted. "Sometimes I miss."

Pete: "Around a camp fire there were four chaps under one groundsheet. How many got wet?"

Sam: "None. It was not raining."

"The nursery is lovely," said the visitor to a young mother, "but why do you keep your child in such a high cot?"

"Well, I'm in the kitchen most of the time," explained the mother, "and I want to be able to hear him if he falls out."

The old man was complaining of pains in one of his legs. The doctor carried out a lengthy examination and finally diagnosed the trouble as old age.

"Old age," stormed the old chap. "Old age be blown. T'other leg's same age and there isn't anything wrong with that!"

"Thank you, sir," said the chemist. "That's three hot-water bottles, two bottles of cough mixture, and one large tin of aspirins. I'll send them round right away. All well at home, I hope?"

Boss, to new employee: "Remember, you're never to go over my head."

Employee: "Yes, sir, but is it all right to pray for a raise?"

A gentleman was visiting a prison when he saw a convict sewing mail-bags.

"Ha," said the gentleman to the prisoner, "sewing my man?"

"No," was the reply, "Reaping!"

Colonel: "Are you happy now that you're in the Army?"

Private: "Yes, sir."

Colonel: "What were you before you joined up?"

Private: "Much happier."

Boss: "What are you doing here? I sacked you a month ago."

Ex-employee: "Yes, I know. I just came back to see if you were still in business."

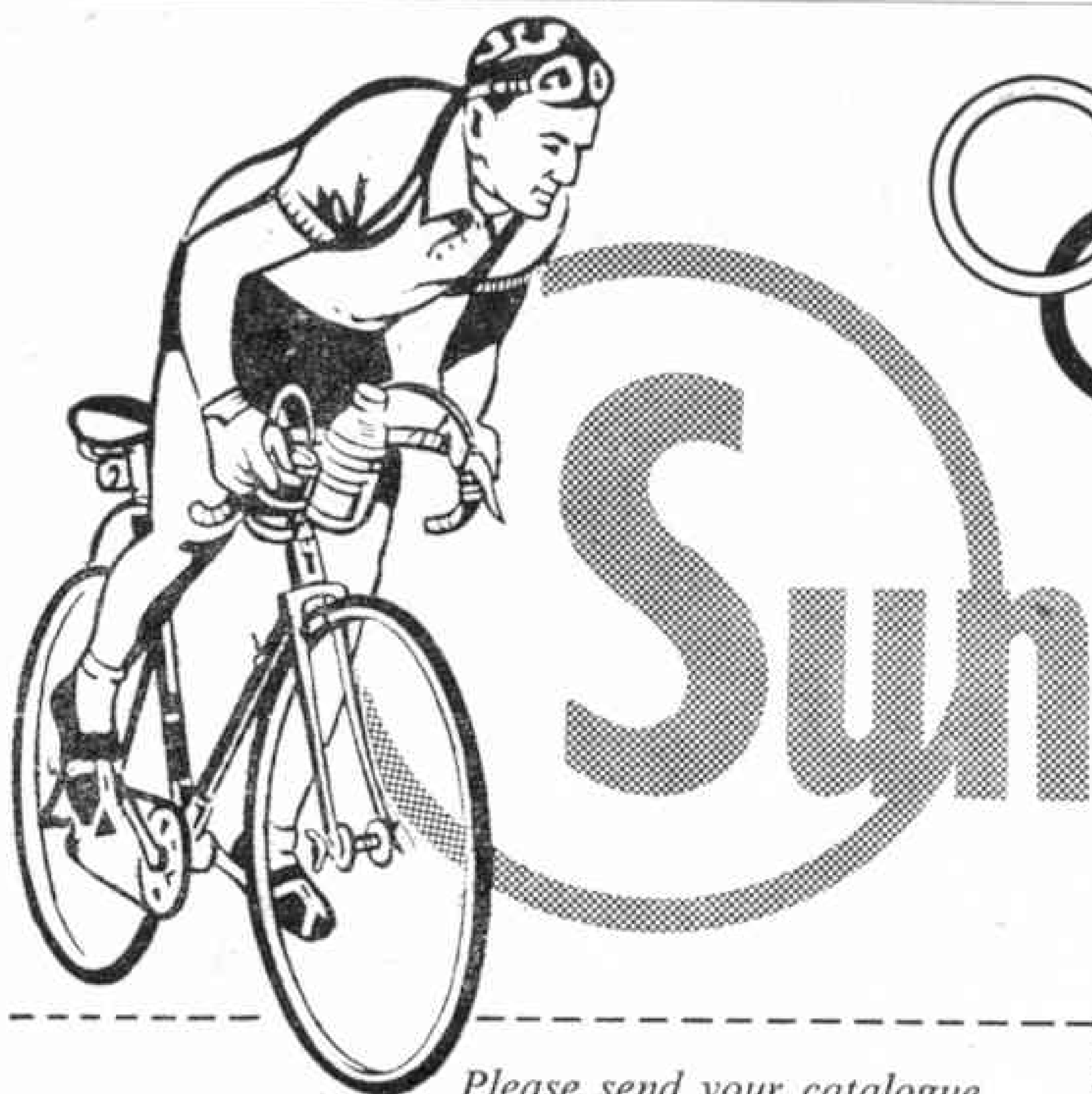
ANSWERS TO LAST MONTH'S PUZZLES

The Mouse and the Corn

Nine ears of corn were in the box. Two of the ears carried out each time by the mouse were on its head—its own!

Five Vowels in a Row

One of the words Tommy discovered had already been used by the teacher. It was "facetious". The other one was "abstemious".



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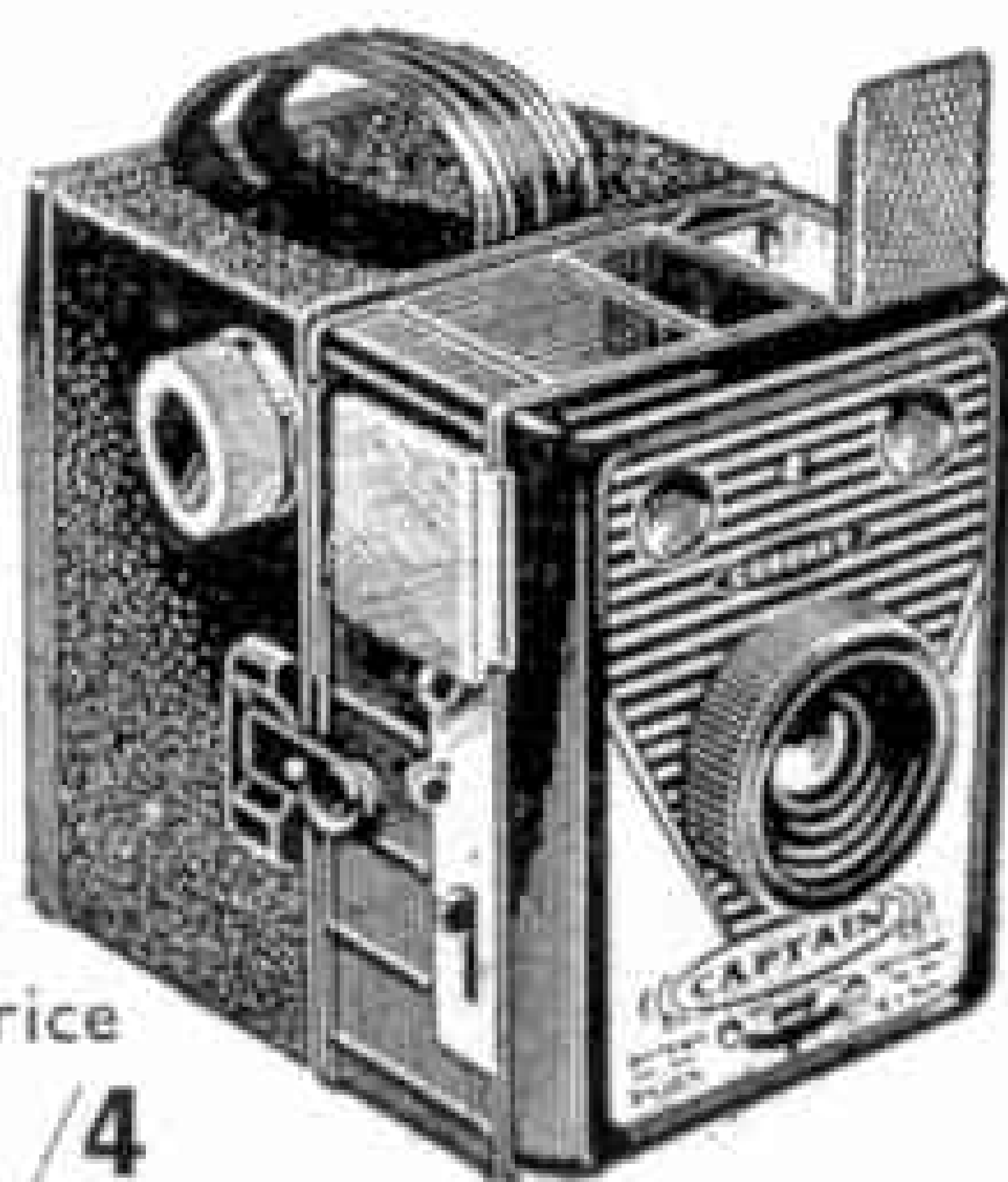
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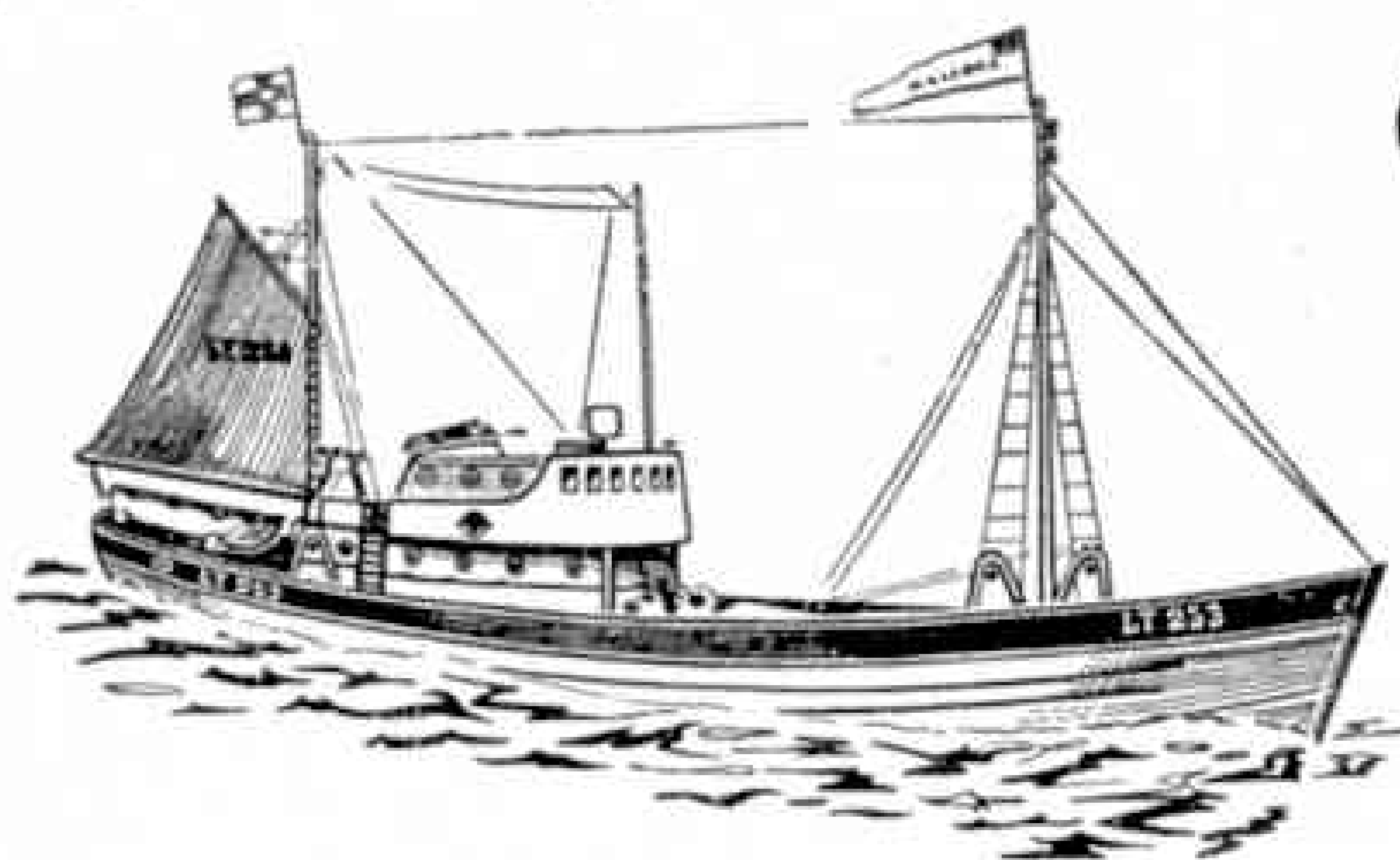
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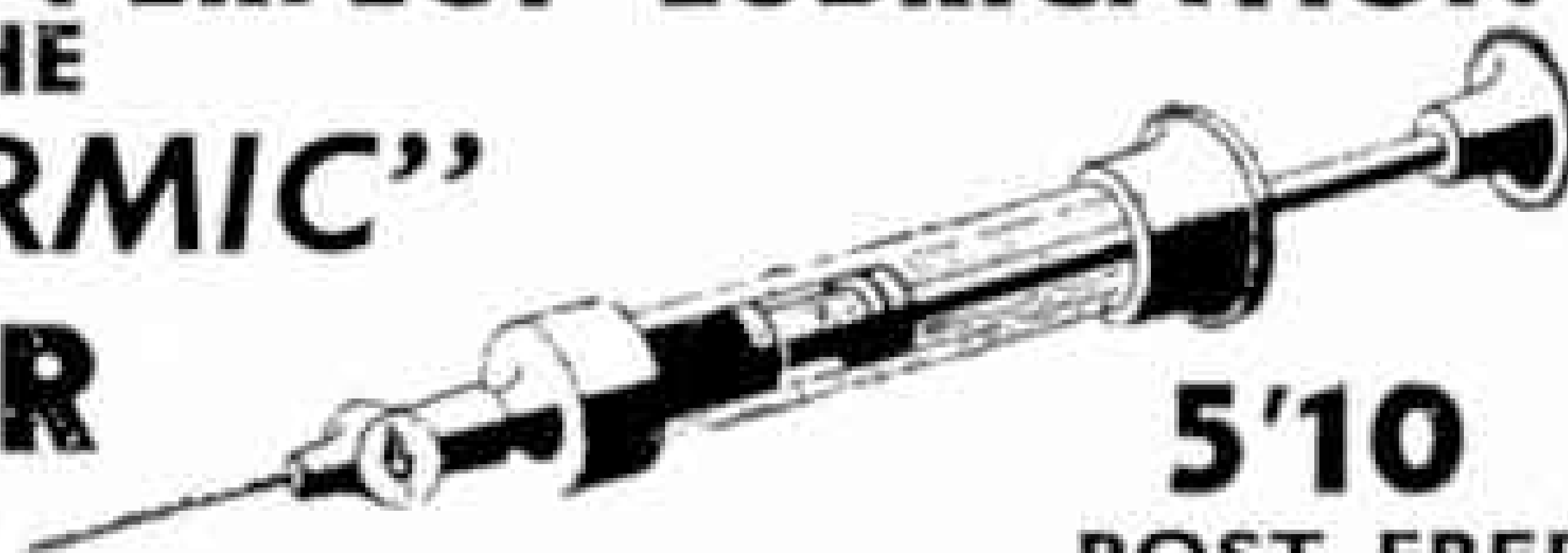
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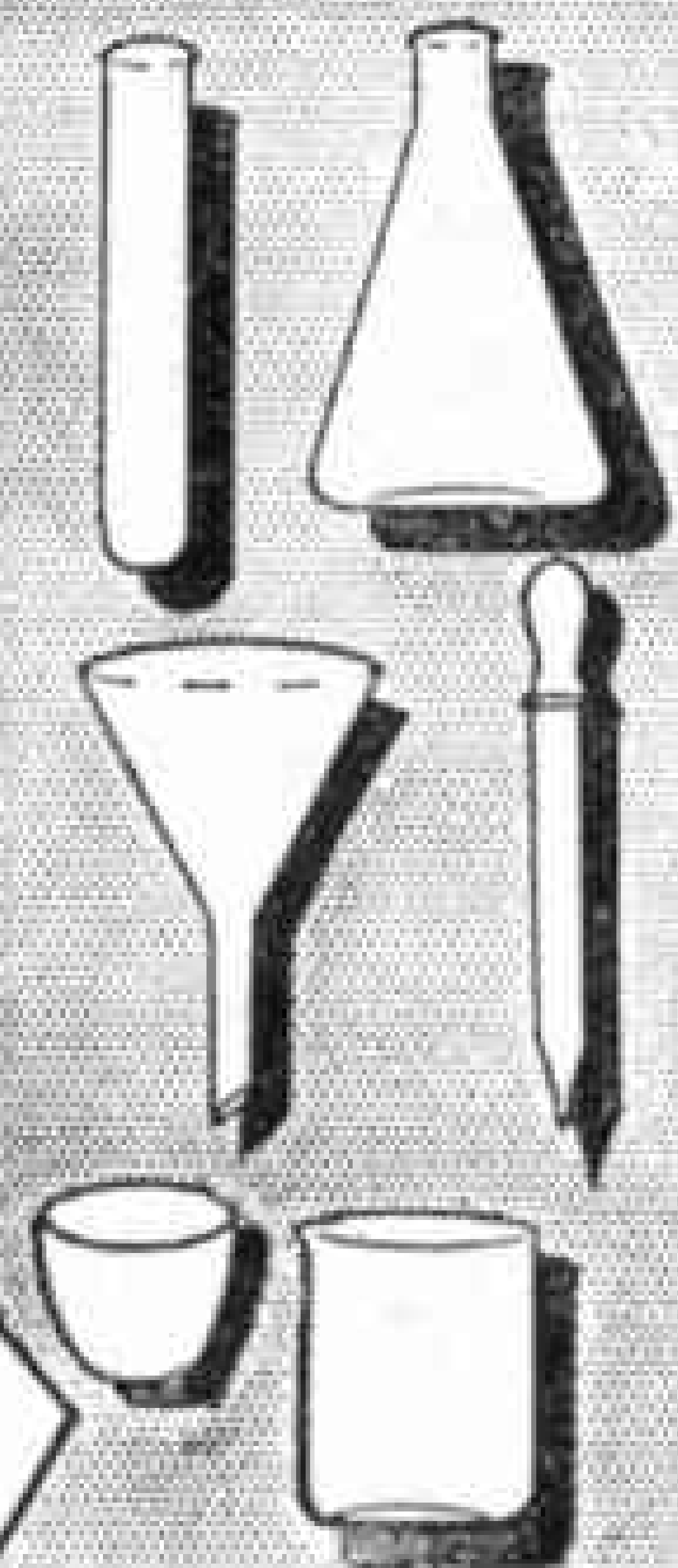
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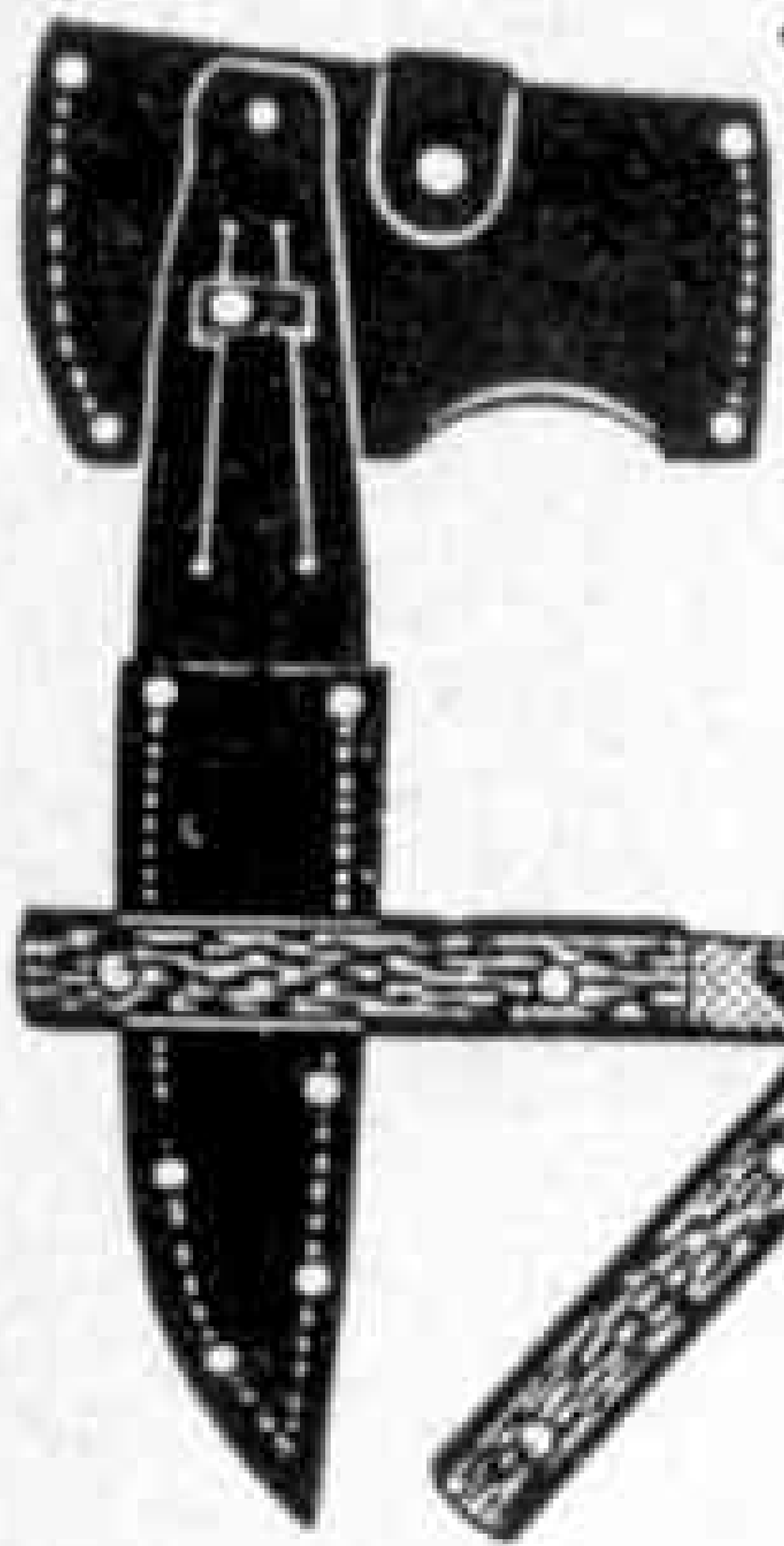
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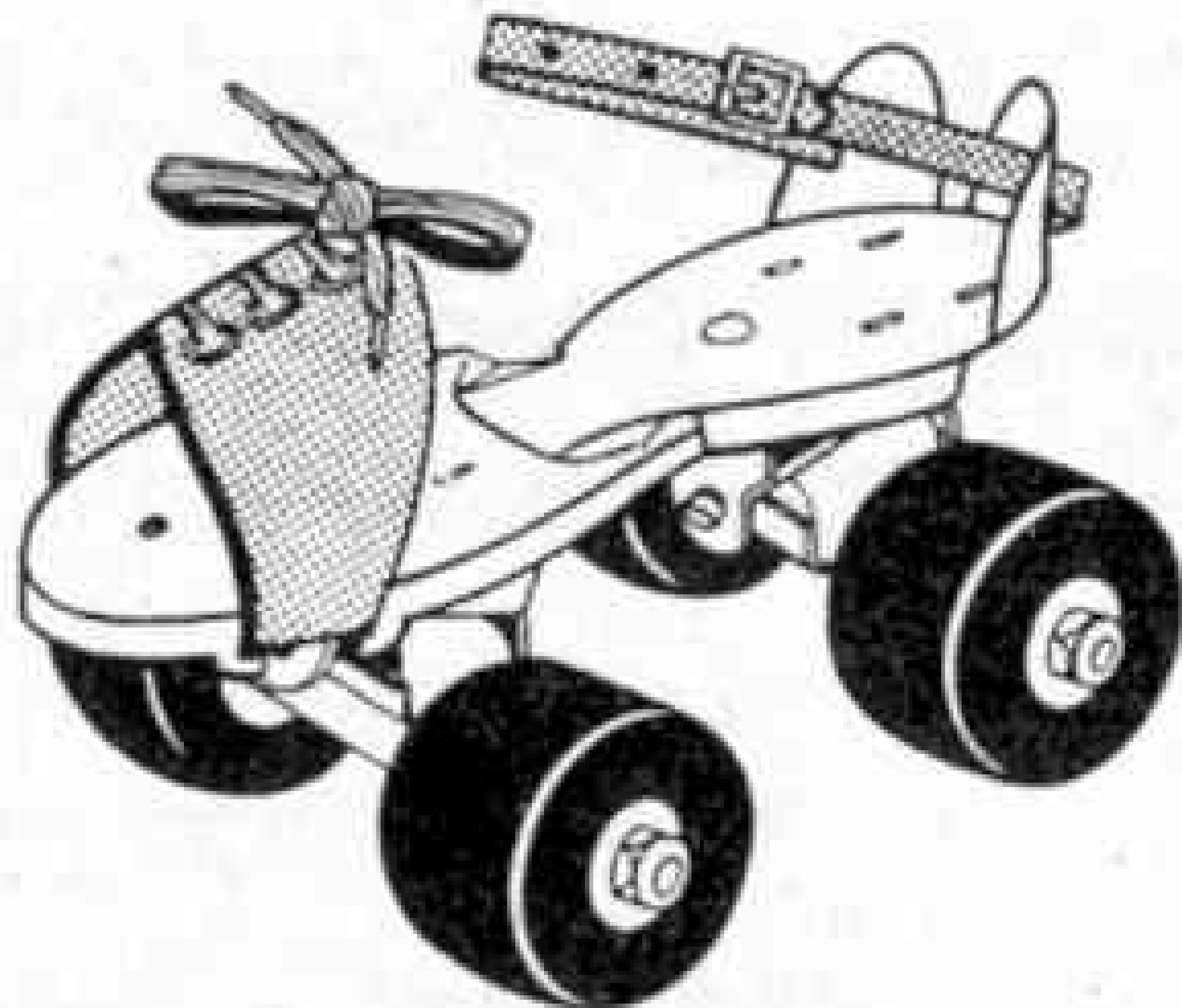
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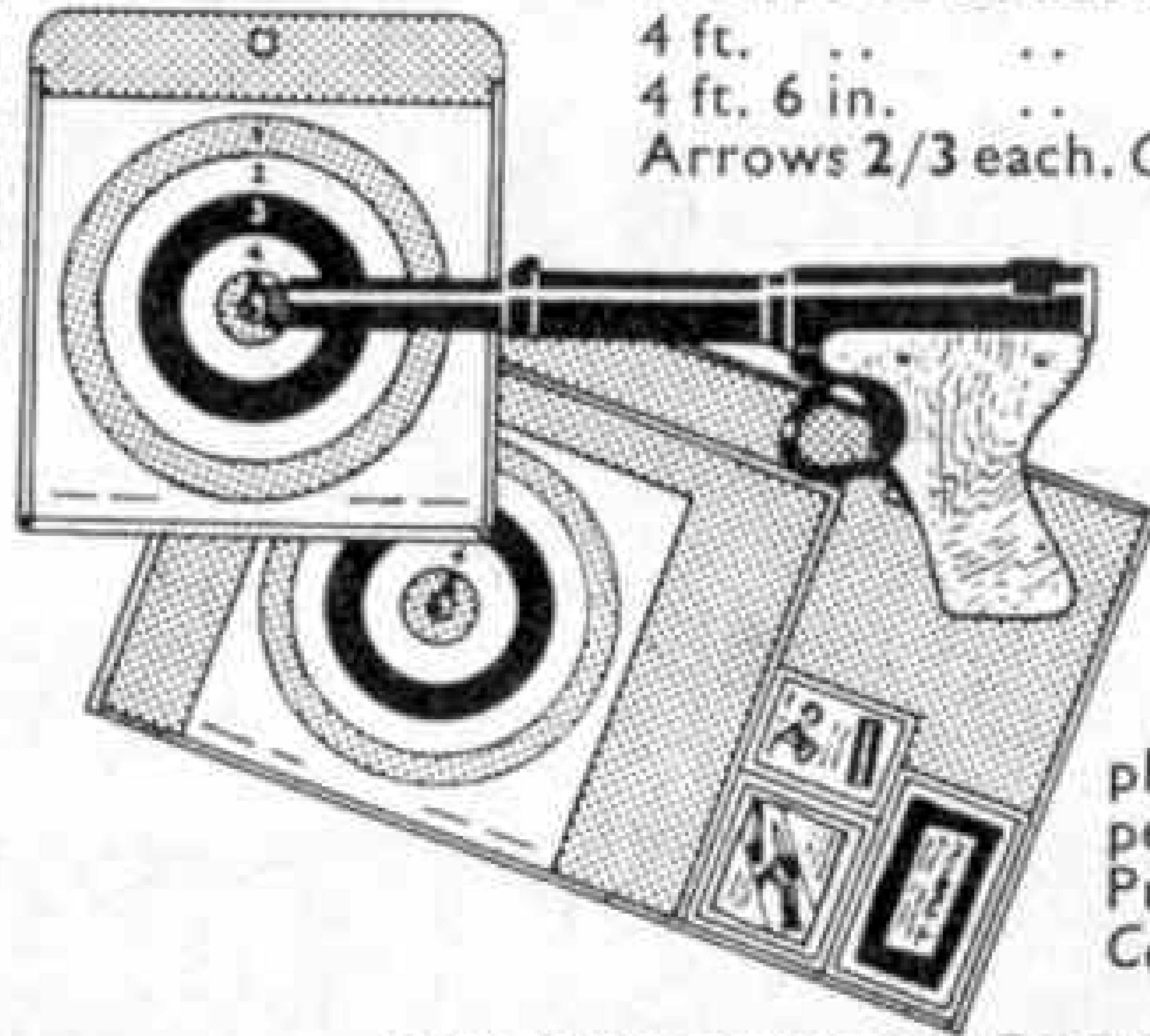
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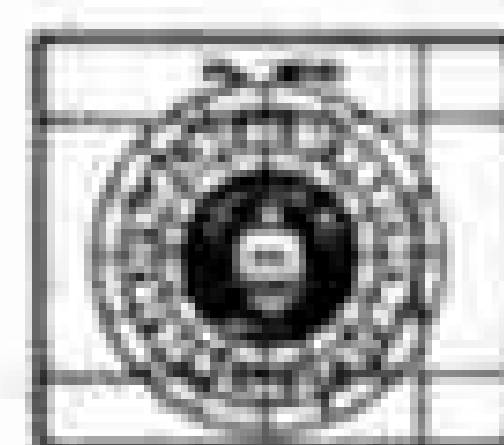
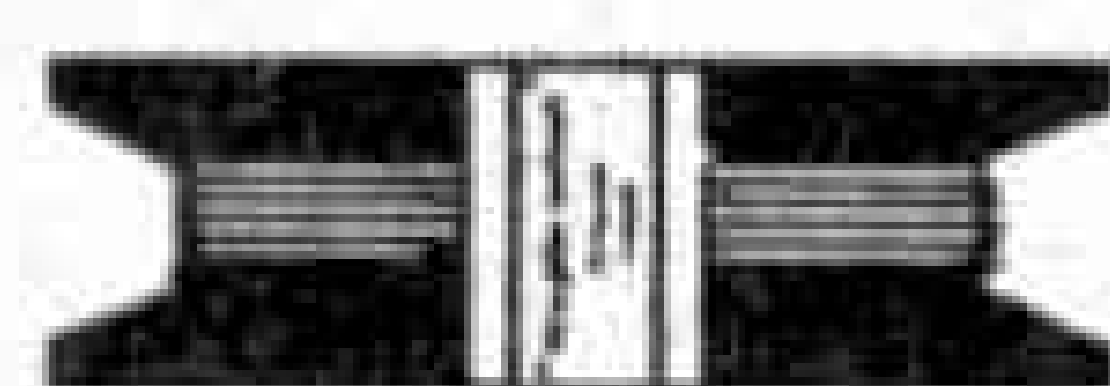
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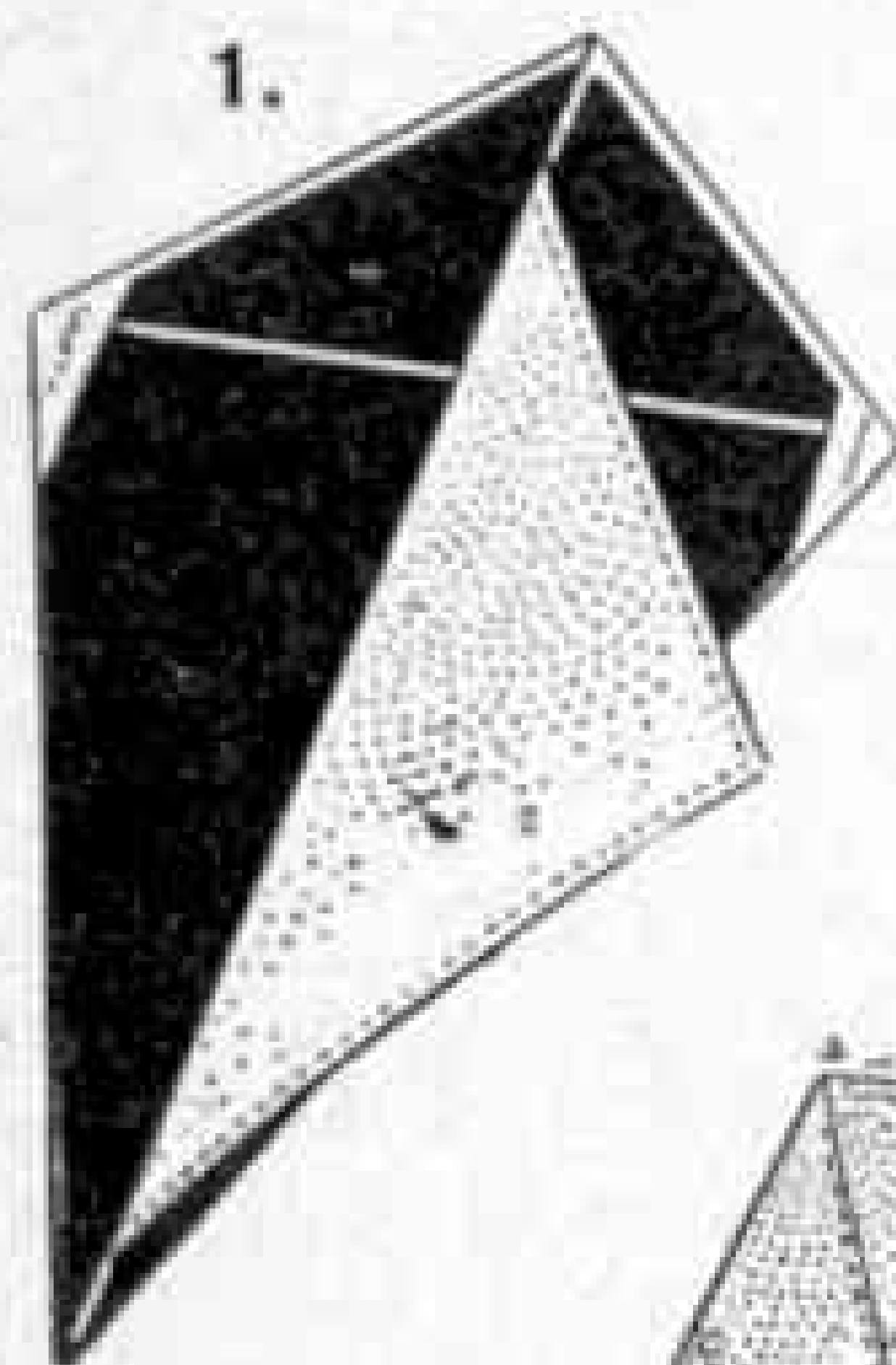
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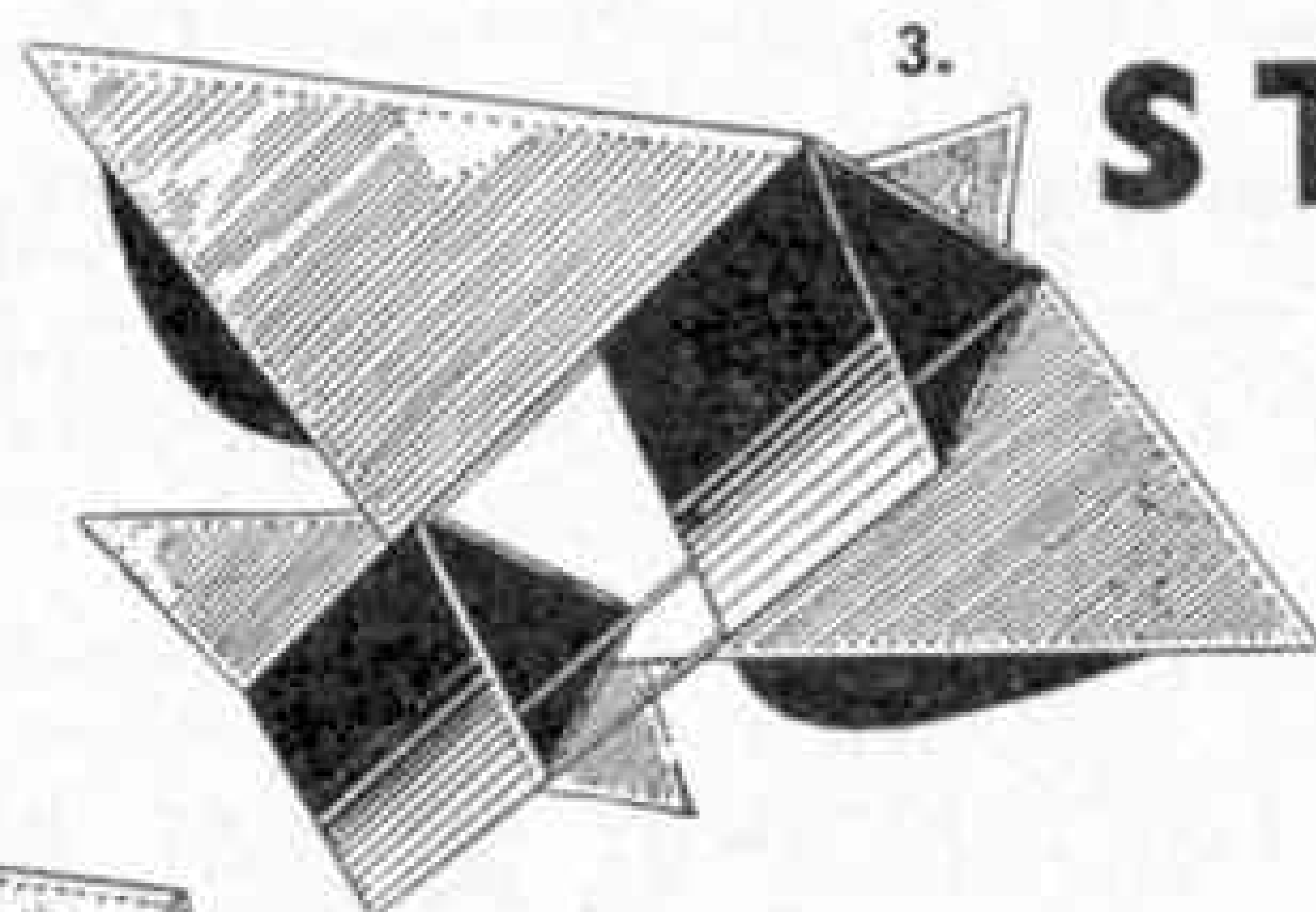
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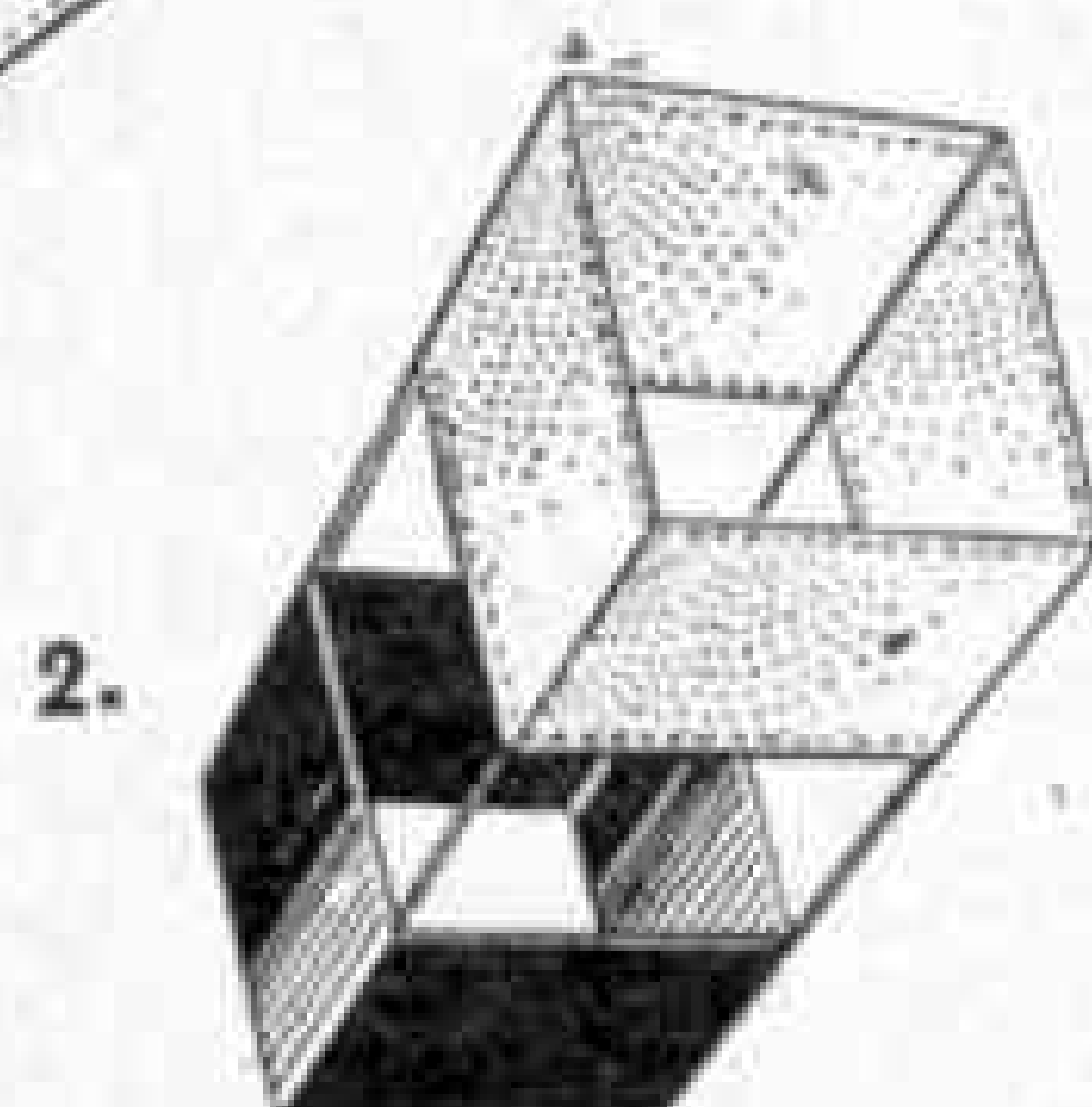
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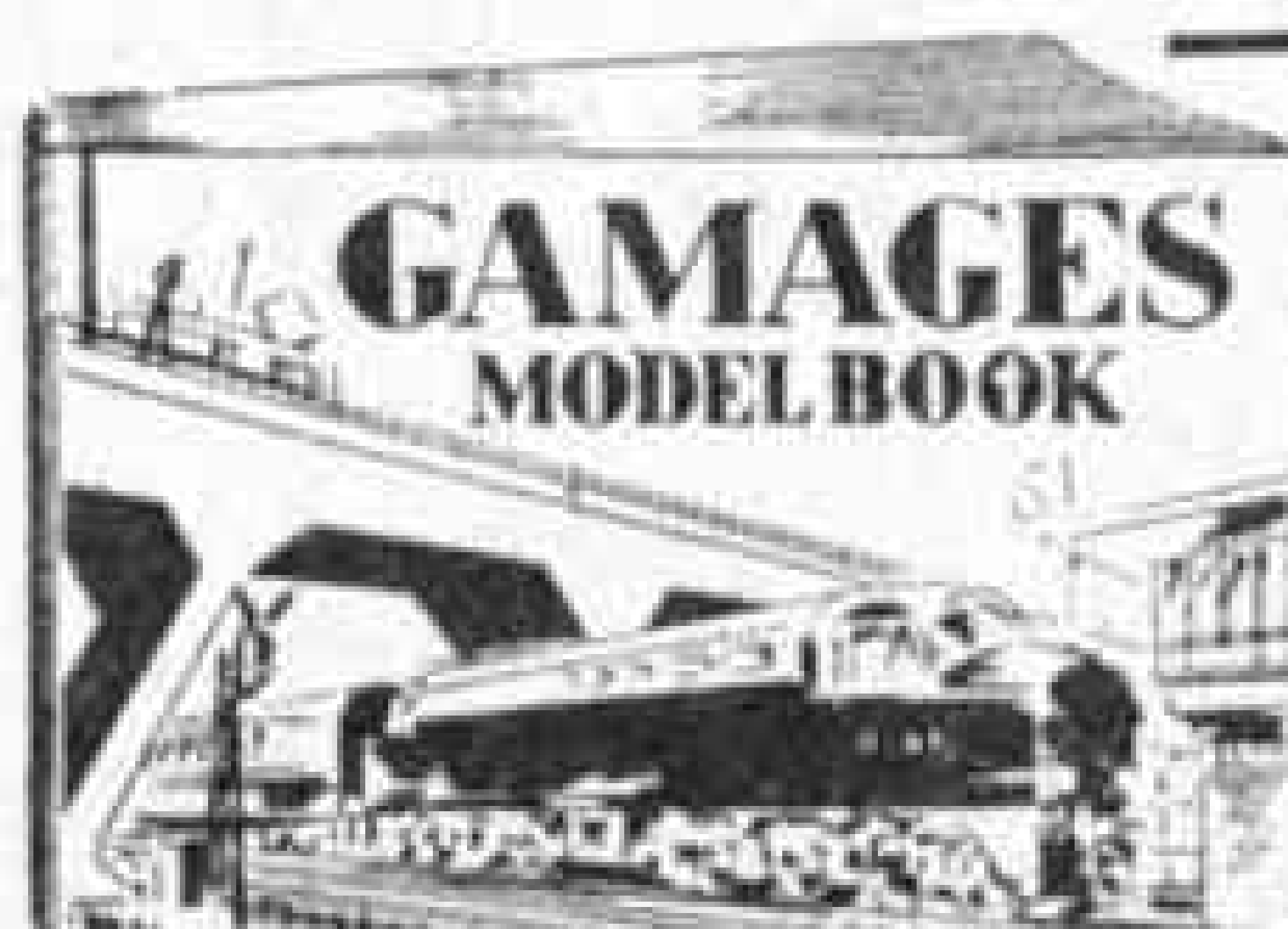
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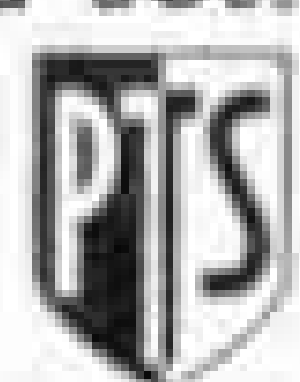
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Standard Mechanisms. How to Use Meccano Parts, Book of New Models, Super Leaflets, gigantic (10 by 13 holes), Meccano Spring Motor 1926. Instruction Books. "M.M.s" 1945-1949. Vertical Meccanograph Illustration.—Andreas Konkoly, Budapest XIII, Katona Jozsef 28, Hungary.

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"M.M.s" 1942 less June; 1943 less June, October, November; 1944 less June to September; 1945 less May, September, November, December; 1946 less February, April, May, August; 1947 less September; 1948 less August, September; March and June only in 1949; 1950 less February, June, August, September, October; 1951 less February, March, May, June, August, November, December; February and April only in 1952; December 1953; November 1955; 1957 and 1958 complete. What offers?—R. F. Corley, 490 Albertus Avenue, Peterborough, Ontario, Canada.

"M.M.s" October 1953-November 1959, February 1954 and May 1955 missing. Good offers to—Thomas, Dolphin Cottage, Brent Knoll, Highbridge, Somerset.

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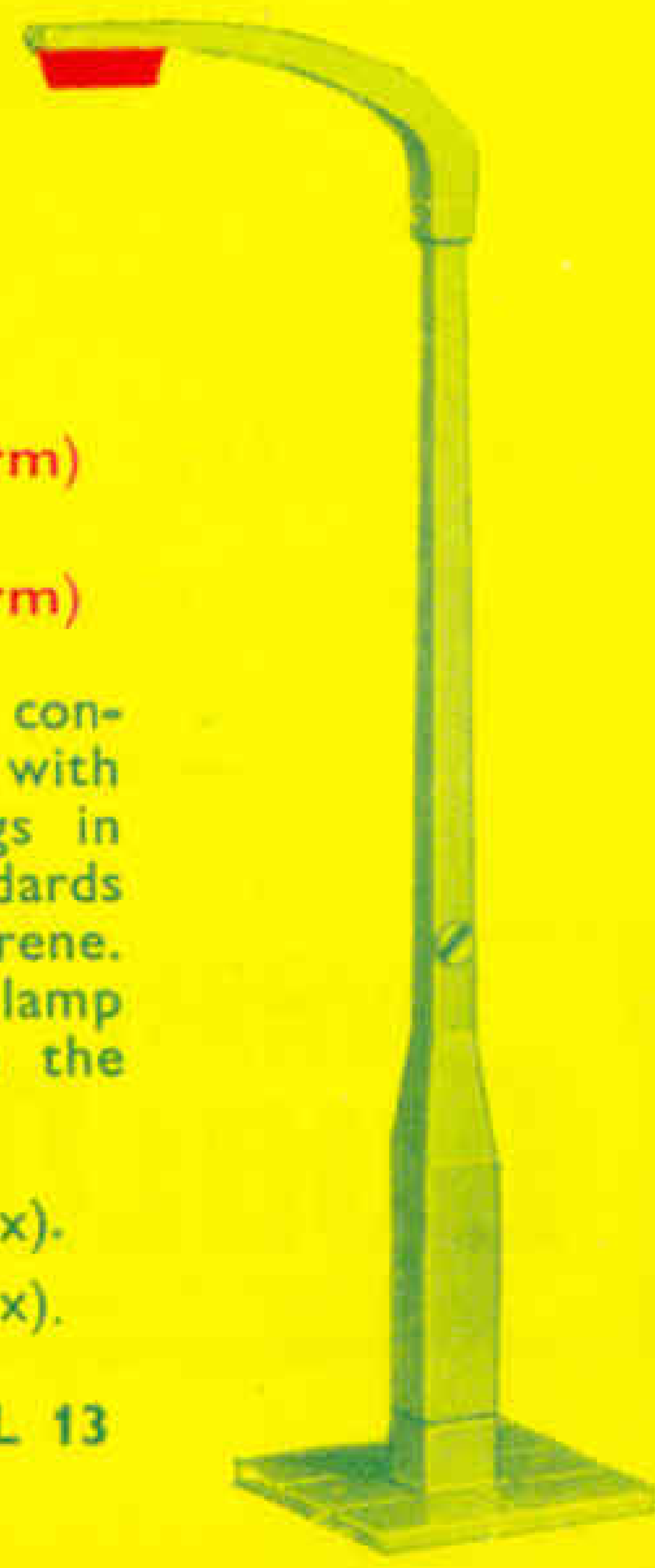
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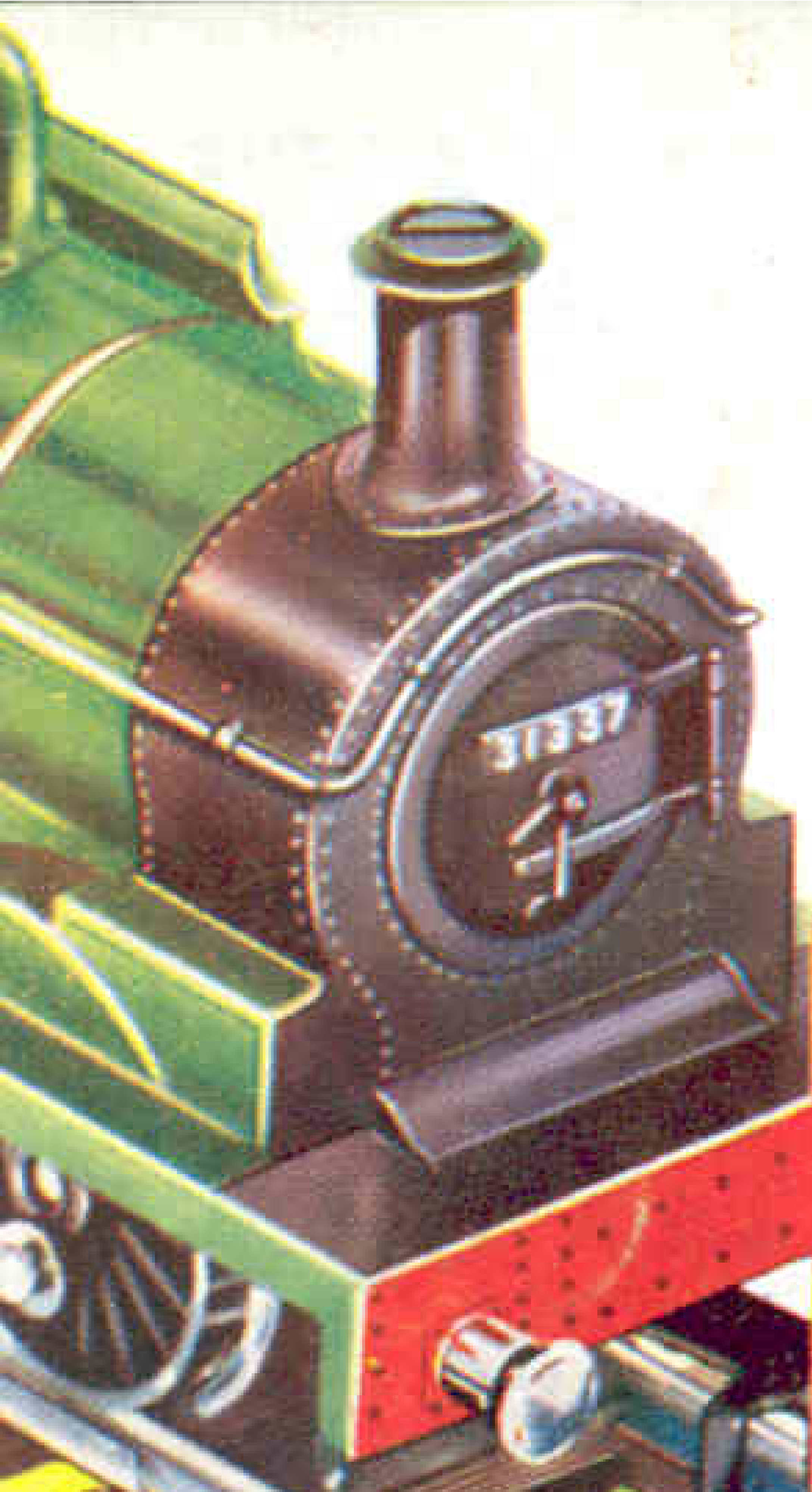
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